

**CORPORATION OF THE VILLAGE OF BARNWELL  
IN THE  
PROVINCE OF ALBERTA**

**Municipal Engineering Standards  
POLICY NO 03-07**

Purpose:


To amend Municipal Engineering Standards Policy 5-99 including Schedule 'A'

Policy Statement & Guidelines:

The following amendments to the Village of Barnwell Municipal Engineering Standards as per Policy 5-99.

1. The amendment to section 3.1.3 as recorded in Schedule A of Policy 5-99 is amended to read:.. Weeping tile drain may not be discharged into the sanitary sewer.
2. Section 7.0 is to include the statement that "Curbs and gutters will be required in all new subdivisions and developments with a majority of parcels ½ acre or less"
3. Section 8.1 is amended to read : Sidewalks shall be constructed only on those lands that, in the opinion of the Engineer and/or as determined by resolution of council, generate significant pedestrian traffic.

	Date	Resolution #
Approved	June 21/07	86/07
Amended		
Amended		

  
MAYOR

  
ADMINISTRATOR

**CORPORATION OF THE VILLAGE OF BARNWELL  
IN THE  
PROVINCE OF ALBERTA**

**MUNICIPAL ENGINEERING STANDARDS  
POLICY NO. 5-99**

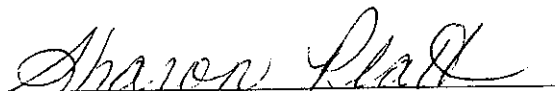
**Purpose:**


To establish Municipal Engineering Standards as a minimum design standard for subdivision development.

**Policy Statement and Guidelines**

The Village of Barnwell will adopt the Town of Taber, Design Guidelines for Subdivisions, Schedule "B", (1993-05), Section "D", Minimum Design Standards for Development as the Village of Barnwell Municipal Engineering Standards for Development with the exceptions and clarifications as per Schedule 1, which is attached to and forming part of this Policy.

	Date	Resolution #
Approved	Sept 16/99	137/99
Amended		
Amended		

  
MAYOR

  
ADMINISTRATOR

**VILLAGE OF BARNWELL  
MUNICIPAL ENGINEERING STANDARDS**

**POLICY 5-99  
SCHEDULE 'A'**

**EXCEPTIONS, CLARIFICATIONS AND ADDITIONS**

(refer to Town of Taber, Design Guidelines for Subdivisions, Section D - Minimum Standards for Development)

**2.2.1, "Footnote 1"** to be replaced with: Minimum size of 150 millimetre diameter can be used in some locations because that is the size of most existing pipelines; however, the main trunk pipelines should be 200 millimetre diameter minimum and all pipelines should be looped if possible. Short residential cul-de-sacs of six lots or less can be served with a 75 mm minimum diameter pipeline.

**2.2.6** - All mains shall be installed to a minimum depth of 2.5 metres of cover below finished design grade as established for the development.

**3.1.3** - Weeping tile drain may <sup>not</sup> be discharged into the sanitary sewer.

**3.1.4** - Consideration should be given to installing a 150 millimetre diameter tile drain parallel to the sanitary sewer. The invert elevation of the tile should be at the same elevation as the center line elevation of the sanitary sewer and outlet into the sanitary sewer manholes. The tile drain should be installed with a filter sock and a 200 millimetre envelope of crushed pitrun around it.

**6.0 - ROADWAYS**

Most roadways, except for Heritage Road, should have a pavement width of approx. 10 to 10.5 meters and have a curb return radius of 9 metres (exists currently). Road right-of-ways should be 20 metres wide. This is the recommended roadway elements.

## **VILLAGE OF BARNWELL**

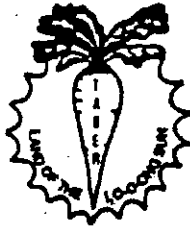
### **MUNICIPAL ENGINEERING STANDARDS**

(Short Version for servicing individual lots within a developed area of the Village)

1. Water service connections are to be installed in accordance to Section "D" 2.5 Service Connections. In addition to these standards, it is recommended that a 25 mm diameter service be installed to a residential home. A 20 mm diameter water meter is to be installed as approved by the Village.
2. Sanitary sewer service connections are to be installed in accordance to Section "D" 3.4 Service Connections. In addition to these standards, a 50 mm diameter pipeline maybe used when a pressure sewage pump is being installed in the home.
3. Storm drainage from and past the lot is to be designed in accordance to Section "D" 4.1 General. The driveway into the lot and the landscaping around the lot shall not interfere with surface drainage in the area. Drainage design must be approved by the Village.

Pages attached.

# **SCHEDULE "B"**



## **TOWN OF TABER**

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### **DESIGN GUIDELINES FOR SUBDIVISIONS**

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<b>A</b>	<b>DEVELOPMENT METHODOLOGY</b>
<b>B</b>	<b>PROCEDURES FOR DEVELOPMENT</b>
<b>1.0</b>	<b>DEVELOPMENT BRIEF</b>
<b>1.1</b>	<b>GENERAL</b>
.1	<u>Development Proposal</u>
.2	<u>Outline Plan</u>
.3	<u>Servicing Plan</u>
.4	<u>Geotechnical Report</u>
<b>2.0</b>	<b>DEVELOPMENT AGREEMENT</b>
<b>2.1</b>	<b>GENERAL</b>
<b>3.0</b>	<b>OVERALL LAYOUT</b>
<b>4.0</b>	<b>LOCAL IMPROVEMENTS</b>
<b>5.0</b>	<b>REVIEW OF PROCEDURES</b>
5.1	BEFORE CONSTRUCTION
5.2	DURING CONSTRUCTION
5.3	FOLLOWING CONSTRUCTION
<b>C</b>	<b>SUGGESTED OUTLINE FOR DEVELOPMENT AGREEMENT (NOT INCLUDED)</b>
<b>D</b>	<b>MINIMUM DESIGN STANDARDS FOR DEVELOPMENT</b>
<b>1.0</b>	<b>GENERAL</b>
<b>2.0</b>	<b>WATER SYSTEM</b>
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2.2	WATER MAIN
2.3	HYDRANTS
2.4	VALVES
2.5	SERVICE CONNECTIONS

- 2.6 TESTING AND DISINFECTION
- 2.7 CATHODIC PROTECTION

### **3.0 SANITARY SEWER SYSTEM**

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  - .1 Residential Contribution
  - .2 Commercial/Industrial Contributions
  - .3 Infiltration
- 3.2 PIPE
- 3.3 MANHOLES
- 3.4 SERVICE CONNECTIONS
- 3.5 TESTING OF SEWERS
  - .1 Water Leakage Test
  - .2 Camera
- 3.6 SEWER MAIN INSTALLATION
- 3.7 CURVED SEWERS
- 3.8 TRENCHING AND BACKFILLING

### **4.0 STORM DRAINAGE SYSTEM**

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- 4.2 DESIGN FORMULA
- 4.3 PIPE
- 4.4 MANHOLES
- 4.5 CURVED SEWERS AND TRENCHING AND BACKFILLING
- 4.6 VIDEO INSPECTION
- 4.7 CATCH BASINS
- 4.8 DRAINAGE COURSE
- 4.9 STORM WATER MANAGEMENT

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- 5.3 DESIGN

**6.0 ROADWAYS**

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- 6.2 GEOMETRIC DESIGN
- 6.3 CLEARING AND GRUBBING
- 6.4 STRIPPING TOPSOIL
- 6.5 RIGHT-OF-WAY GRADING
- 6.6 SUB-GRADE CONSTRUCTION
- 6.7 BASE COURSE CONSTRUCTION
- 6.8 PAVEMENT DESIGN
- 6.9 ASPHALT SURFACE
- 6.10 TOLERANCES
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  - .2 Density
  - .3 Complete Pavement
- 6.11 LANES

**7.0 CURBS AND GUTTERS**

- 7.1 TYPE AND LOCATION
- 7.2 CONCRETE
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**8.0 SIDEWALKS**

- 8.1 REQUIREMENT
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**9.0 LANDSCAPING**

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- 9.2 SCOPE
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- 9.4 SEEDING
- 9.5 SOUND ABATEMENT
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- 10.1 INSTALLATION
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- 10.3 LOCATION

**11.0 TRAFFIC CONTROL, DEVICES AND STREET NAME SIGNS**

- 11.1 TRAFFIC SIGNS
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**12.0 GAS, POWER, CABLE TELEVISION AND TELEPHONE SERVICES**

- 12.1 INSTALLATION
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**13.0 RAILROAD SPUR LINES**

- 13.1 INSTALLATION
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**14.0 SURVEY CONTROL MONUMENTS**

**15.0 STANDARD DETAILS**

**SECTION D**

**MINIMUM DESIGN STANDARDS FOR DEVELOPMENT**  
**(Revision Date: May, 1993)**

## 1.0 GENERAL

- .1 The standards outlined herein are intended to be the minimum standards, not the standard. It is the Developer's responsibility to develop the subdivision to meet or exceed these standards in accordance with good engineering practices, specific site conditions and as required by the Town.
- .2 Materials installed within the subdivision shall be tested to confirm compliance with the most recent standard of either AWWA, ASTM or CSA.

## 2.0 WATER SYSTEM

### 2.1 DESIGN

The waterworks system is to be designed in accordance with recommended standards and the design manual of the American Water Works Association (AWWA). The system is to be designed as part of the overall or ultimate Town distribution system to meet maximum day consumption plus fire flows or peak hour flow, whichever is the greater. Velocities at maximum flows are not to exceed 1.5 metres per ~~second~~ <sup>second</sup>.

The waterworks system is designed to meet the Insurance Bureau of Canada recommended standards. Generally these are:

Single Family Residential .....	60 litres/second (800 igpm)
Multi-Family Residential .....	90 litres/second (1200 igmp)
Walk-up Apartments .....	115 litres/second (1500 igpm)
Institutional .....	90 litres/second (120 <sup>0</sup> igpm)
Commercial .....	190 litres/second (2500 igpm)
Light Industrial .....	230 litres/second (3000 igpm)

\*

The minimum ground elevation residual pressure in the system shall be 310 kilopascals (45 psi) except at the hydrant used to fight the fire where the residual pressure shall be a minimum of 140 kilopascals (20 psi) at the minimum required fire flow at that local. Where a sprinkler system is proposed a minimum pressure of 310 kilopascals (45 psi) is required.

The consumption pre capita shall be:

Average Daily Demand .....	350 litres/person/day
Peak Daily Demand .....	2.0 x average daily demand
Peak Hourly Demand .....	3.0 x average daily demand

The design population shall be the ultimate for the area under consideration.

Commercial and Industrial areas shall be designed on the basis of equivalent population subject to the peak daily demand and peak hourly demand multipliers. The equivalent populations are:

Commercial .....	37 equivalent people/hectare
Industrial .....	30 equivalent people/hectare

## 2.2 WATER MAIN

- .1 Minimum size 200 millimetre diameter - residential<sup>1</sup>.
- .2 Minimum size 250 millimetre diameter - commercial
- .3 Minimum size 300 millimetre diameter - industrial
- .4 Main sizes may be increased as considered necessary by the Town Engineer to accommodate future development.
- .5 Pipe shall be PVC pressure pipe AWWA C900 with a minimum 1035 kPa working pressure unless otherwise approved in writing by the Town of Engineer.
- \* .6 All mains shall be installed to a minimum depth of 3 metres of cover below finished design grade as established for the development.
- .7 All mains shall be provided with compacted granular bedding and backfill up to at least 300 millimetres above the pipe.
- .8 Installation is to comply with manufacturers recommendations.
- .9 A minimum of three metres separation is to be maintained between a water main and any sewer main or as may be approved by Alberta Environment. A minimum distance of 1.8 m must be maintained between any water main, power or telephone cable or ductline or television cable.
- .10 The maximum length of a dead end in a cul-de-sac shall be restricted to that which will allow complete coverage of each lot fronting on the cul-de-sac with a 150 m length of fire hose from a hydrant located at the entrance of a cul-de-sac and tied to a loop main. Long hydrant leads to satisfy the above condition will not be permitted.

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\* <sup>1</sup> Short residential cul-de-sacs of ten lots or less can be served with a 150 mm minimum.

## 2.3 HYDRANTS

- .1 Maximum spacing between hydrants measured in any direction shall be in accordance with the Insurance Bureau of Canada and not exceed:
  - 150 metres for single family residential
  - 100 metres for commercial/industrial/multi-family/institutionalHydrants shall be located such that the distance to any building entrance shall not be greater than 75 m.
- .2 Hydrants shall be located to conform with the sidewalk and/or the curb and gutter and driveway design and as follows:
  - Residential ..... 0.3 m clear of back of sidewalk  
1 m off property line where there is no sidewalk
  - Commercial/Industrial ..... 1.5 m from face of curb  
1 m off property line where there is no curbHydrants shall be installed at the projection of property lines except where the hydrants are installed at intersections, they shall be installed at the beginning of curb returns.
- .3 Hydrants shall be of a type meeting Town Water Department Standard Canada Valve Century model or approved equivalent complete with:
  - .1 Two (2) hose nozzles Alberta Mutual Aid Thread.
  - .2 One (1) pumper connection, Alberta Mutual Aid Thread.
  - .3 Operating nut to be #1 Nut 1¼ inch square.
  - .4 All bolts and nuts shall be stainless steel.
  - .5 600 mm extension on top with breakaway flange.
  - .6 Compression type closing with pressure.
  - .7 Iron body, bronze mounted with O ring seals at operating nut.
  - .8 Barrel ID - 150 mm minimum.
  - .9 Bottom connection with drip valve and drain.
  - .10 Turn to open - counter clockwise.
  - .11 A gravel drainage pit shall be provided at the bottom of the hydrant.
- .4 Hydrants shall be as manufactured by Canada Valve Ltd. or as approved by the Town Engineer. Hydrants shall be painted to meet Town standards (~~yellow body, black caps~~). (*red body, silver cap.*)
- .5 The hydrant leads shall be level and the invert depths of hydrant location are 2.85 m below curb top grade while maintaining 50 mm below the bottom of the hydrant flange and finished grade.
- .6 All bolts below ground level shall be stainless steel. Coat exterior bolts with Denso Mastic and Denso Tape.

## 2.4 VALVES

- .1 A sufficient number of valves shall be provided so that no more than four (4) valves must be closed to isolate any one section of water main. One section is defined as meaning no more than 20 residential lots will be out of service due to service interruption or two hydrants are taken out of service.
- .2 Resilient seal gate valves shall conform to AWWA C501 with a non-rising spindle, to open by turning in a counter-clockwise direction. All bolts and nuts shall be stainless steel.
- .3 Valve boxes with operating stem and rock disk nut are required on all valves. All valve boxes shall be Norwood Type A or as approved by the Town Engineer. The rock disk nut shall no more than 0.3 metre below finished grade. Valve boxes shall be adjusted for 300 mm up or down.
- .4 An isolating valve shall be provided on each hydrant lead. This valve shall exist completely in the sidewalk or entirely out of the sidewalk and conform to the grade of the surrounding area.
- .5 At street intersections, valves shall be located on the projection of the street property lines. At mid-block locations, valves shall be located on the projection of lot lines.
- .6 In rural settings, each valve box shall be marked by a vertical, nominal size 2" x 4" timber set 1 m into the ground adjacent to the valve box and extending 1 m above the top surface of the surrounding ground. The exposed portion of this marker-post shall be painted red.
- .7 Flush valves shall be installed at all dead end mains except where the hydrants are located within 15 m of the end.
- .8 All bolts shall be stainless steel. Coat all exterior bolts with Denso Mastic and Denso Tape.

## 2.5 SERVICE CONNECTIONS

- .1 Minimum size 20 millimetre nominal diameter.
- .2 Corporation stop to be provided at the mains. Direct taps will not be allowed. Service saddles are to be used at all main connections. The corporation cock is to be compression fitting to Muller Thread equal to Muller H 15008 without thawout connection. Service saddles shall be Robar 2706 or approved equivalent.
- .3 The curb stop shall be provided with each service connection. It shall be placed .3 metre off the property line. The curb stop is copper to copper inverted key type stop and drain equal to Muller Oriseal H 1519 or as approved by the Town Engineer. The service box shall be extension type for a maximum extension of 3 m equal to Muller A714 or as approved by the Town Engineer.

- .4 Pipe shall be Type K copper conforming to AWWA Specification C800, or Polybutylene for all sizes 50 millimetres and under. For service size greater than 50 mm use water main piping.
- .5 All service lines shall be installed to provide a minimum depth of 2.5 metres of cover (including "goose neck" or bend off the main).
- .6 Service saddles shall be stainless steel and double strapped.
- .7 For Industrial requirements, service connections shall not be installed until the servicing requirements are known and a permit, approving the installation, is issued by the Town Engineer.
- .8 Water service pipe will be included in the leakage test. Each connection will be counted as one joint in calculating allowable leakage.
- .9 Two copies of the service connection report shall be delivered to the Town Engineer upon completion of the report.
- .10 Installation of service connection:
  - .1 Water service connection shall be designed to:
    - double connection at the joint property line,
    - single connection to centre of lot.
  - .2 Service trenches under pavement, proposed pavement or surface concrete areas shall be backfilled and compacted to 97% Standard Proctor Density.
  - .3 Minimum trench width is pipe diameter plus 600 mm and wide enough so that piping can be laid to the alignment and depth required.
  - .4 Curb stops and service boxes shall be installed to within 300 mm of property line and support curb boxes on 500 mm concrete base. Set service boxes plumb and adjust to grade. If shallow utilities are installed in easements adjacent to the street, the service connection to extend under the shallow utilities, up to one (1) metre beyond the limits of the shallow utility easement.
  - .5 Trench backfill shall be native or granular material. Silt is not acceptable as a backfill material.

## 2.6 TESTING AND DISINFECTION

Leakage testing and disinfection shall be carried out in accordance with AWWA standards and practices, except that the minimum leakage test pressure shall be equal to the pressure rating of the pipe.

## 2.7 CATHODIC PROTECTION

Cathodic protection shall be required on all metallic main valves, fittings and hydrants. A 2.3 kg zinc sacrificial anode shall be connected to each valve, fitting and coupling. A single 5.5 kg zinc anode shall be connected to a hydrant.

### 3.0 SANITARY SEWER SYSTEM

#### 3.1 DESIGN CRITERIA

The sewer main capacity shall be designed to convey the peak hourly sewage contribution and infiltration based on the following:

##### .1 Residential Contribution

- .1 Sewage contribution is to be designed on a density basis of either the subdivision design population density or 40 persons per hectare; whichever is greater.
- .2 Minimum average contribution of 350 litres per capita per day.
- .3 Peak hourly flow for each contributing area calculated at an average flow multiplied by a peaking factor.

$$\text{Peak Factor} = 1 + \frac{14}{4+p^{0.5}}$$

Where p = equivalent population in 1000's.  
The minimum peak factor shall be 2.5.

##### .2 Commercial/Industrial Contributions

- .1 Industrial Flows - Minimum average contribution of 17,500 litres per gross hectare per day.
- .2 Commercial Flows - Minimum average contribution of 14,000 litres per gross hectare per day.
- .3 Peak hourly flow for each contributing area calculated at average flow multiplied by a peaking factor of 3.

##### \* .3 Infiltration

The sanitary sewer is to be water tight and the foundation weeping tile drain and roof leaders are not to be discharged into the sanitary sewer. The infiltration allowance will be calculated at 0.28 l/s/ha for normal installations. Any manholes located in sags were subject to an additional 0.4 l/s per manhole.

### 3.2 PIPE

- .1 Minimum size of 200 millimetre diameter for residential areas and 250 mm diameter for industrial or commercial areas.
- .2 Minimum pipe grades shall comply with Alberta Environment standards. All sanitary sewers shall be designed and constructed to achieve mean velocities when flowing full ~~if~~ not less than 0.75 m/s. The maximum slope for sanitary sewer will be based on limiting the velocity to 3.0 m/s.
- .3 Pipe material shall be:
  - Concrete Pipe - ASTM C76 or C655 sulfate resistant
  - PVC Pipe - ASTM D3034 SDR35
- .4 All pipe shall be provided with compacted granular bedding and backfill up to 300 millimetres above the pipe.
- .5 Installation is to comply with manufacturer's recommendations.

### 3.3 MANHOLES

- .1 Manholes shall be precast concrete with a minimum 1.2 metre inside diameter in the main portion of the structure and shall conform to ASTM C478. All concrete shall be sulfate resistant, type 50.
- .2 Frames and covers shall be of a floating style (NF80 or 90) capable of withstanding H-20 loading. The following words shall be permanently embossed on the cover: "Sanitary Sewer".
- .3 Manhole spacing shall comply with Alberta Environment standards and to a maximum spacing of 120 metres.
- .4 All joints shall be designed and constructed to be water tight using a rubber gasket joint.
- .5 All manhole bases are to be pre-benched manhole bases.
- .6 Manhole rings - hot dipped galvanized steel safety steps.
- .7 Manholes shall be provided at the end of each line, at the changes in the size of mains and changes in alignment.

### 3.4 SERVICE CONNECTIONS

- .1 Minimum size 100 millimetre. Sizing and installation of service line in industrial areas will be made only after the service requirements have been determined and a permit, approving the installation, is issued by the Town Engineer.
- .2 Minimum slope on service lines shall be 2.0%.
- .3 Under no circumstances will roof or surface drainage from buildings be permitted into the service connection of the sanitary sewer system.
- .4 Weeping tile from buildings may be permitted to connect to the sanitary sewer system if no storm sewer is available.
- .5 All gravity, sanitary sewer service pipes shall be polyvinyl chloride (PVC) ASTM D3034 SDR 28.
- .6 In-line tees or service saddles as approved by the Town Engineer shall be used on all sewer service connections at the main.
- .7 Sanitary sewer connections shall be designed to:
  - Double connections at the joint property line
  - Single connection to centre of the lot
- .8 Service trenches under pavement, proposed pavement or surface concrete shall be backfilled and compacted to 97% Standard Proctor Density. Service trenches in other areas shall be backfilled and compacted to 95% Standard Proctor Density.
- .9 Minimum trench width is pipe diameter plus 600 mm and wide enough so that the pipes can be laid to the alignment and depth required.
- .10 Plug sewer service pipe at the property line. If there is an easement for shallow utilities adjacent to the road, the service line shall be extend one (1) metre beyond the limits of the shall utility easement.
- .11 Risers shall be installed where connection to main is 4.0 m or deeper.
- .12 Service pipe from the main to the street property line shall be installed to provide a minimum depth of 2.6 m from finish road grade.

- .13 An inspection manhole will be required on all services in industrial areas. Locate the manhole 0.5 m inside the road right-of-way.
- .14 Trench backfill shall be native or granular material. Silt is not an acceptable backfill material.

### 3.5 TESTING OF SEWERS

#### .1 Water Leakage Test

- .1 In areas where the ground water table rises up to the sewer pipe invert or higher, each section of sewer mains and service connections shall be tested for watertightness by an infiltration test. In all other situations an exfiltration test shall be conducted.
- .2 Maximum allowable leakage for an exfiltration test of a sewer pipe while subjected to a minimum .6 metre hydrostatic head of water is as follows:
  - Concrete Pipe - 145 l/day/mm of diameter/km
  - PVC Pipe - 40 l/day/mm of diameter/km
- .3 Tests shall be undertaken on each section of sewer main and the results recorded. Allowable leakage for pipe other than rubber gasket concrete pipe shall be in accordance with the type of joint and the manufacturer's recommendations.

#### .2 Camera

All section of sewer shall be inspected with closed circuit television camera equipment. An inspection report, photos and video cassette (VCR) shall be submitted to the Town for their records prior to issuance of a Construction Completion Certificate.

### 3.6 SEWER MAIN INSTALLATION

- .1 Mains must be installed to provide a minimum depth of cover of 2.5 m below final finish grade.
- .2 Sewer mains shall be installed to provide adequate sewer service connection depth at the property line.

### 3.7 CURVED SEWERS

Curved sewers will be permitted with the following restrictions:

- .1 The sewer shall be laid as a simple curve with a radius equal to or greater than 60 m and running parallel to street centre line or curb line.
- .2 Manholes shall be located at intervals not greater than 90 m along the curve.
- .3 The curve shall be run parallel to the curb or street centre line.
- .4 The minimum grade for sewers on a curve shall be 50% greater than the minimum grade required for straight runs of sewers.
- .5 Length of pipe shall be such that deflections at each joint shall be less than the allowable maximum recommended by the manufacturer.
- .6 In general, curved sewers will be used only where savings in costs or the difficulty of avoiding other utilities necessitates their use.

### 3.8 TRENCHING AND BACKFILLING

- .1 Widths of trenches shall be such that pipes can be laid and jointed properly and backfill placed and compacted properly.
- .2 Trench walls shall be vertical to 300 mm above the top of the pipe and the width at this location shall not exceed the maximum.
- .3 Maximum width - single pipe:
  - .1 750 mm diameter or less - outside diameter of pipe plus 450 mm.
  - .2 Pipe larger than 750 mm diameter - outside diameter of pipe plus 600 mm.
- .4 If it is not possible during construction to maintain allowable trench width assumed by design, the structural design of the pipe shall be re-evaluated to ensure earth loads will not exceed design load carrying capacity or that deflection of flexible pipe will not exceed performance criteria.

#### 4.0 STORM DRAINAGE SYSTEM

##### 4.1 GENERAL

- .1 The requirements for storm drainage systems shall be dependent upon the type of development, the drainage area, and the length of surface drainage runs.
- .2 Open ditches along the streets and lanes within the subdivision will not be accepted unless they are part of a properly design Drainage System.
- .3 The storm sewerage system shall be designed as a separate system. Pipes and their appurtenances (manholes, catch basins, outfall structures, etc.) shall comprise the minor system. This system shall convey run-off from snow melt and rain fall events without sustaining any surface ponding or excessive surface flows from a 1 in 5 year event. The street system, detention facilities, parkland and other land shall comprise the major system. The major system shall convey run-off from up to a 1 in 100 year event and shall be sufficient to prevent any significant property damage (eg. flooding of buildings.)
- .4 Lots shall be graded to direct water away from foundations and where possible, should conform to existing drainage patterns.
- .5 The use of rear lot drainage catch basins will be limited as <sup>much</sup> such as possible. All lots shall provide positive drainage. That is, they shall drain from the rear onto the street. In the case where lanes are provided, drainage will be permitted to the lane.
- .6 Control shall be provided to minimize sediment discharge to the storm sewers. This shall be in the form of properly graded and surfaced streets and lanes, landscaping, catch basin sumps, sediment control structures at pond and lake inlets or other means where appropriate.
- .7 If these standards and specifications do not cover an area of drainage concern, the onus shall be upon the Developer to present alternative corrective measures and recommend proposed drainage standards to be used, based on sound economic, engineering, environmental, maintenance and operational criteria for approval by the Town. The system shall meet the recommended standards of Alberta Environment and Standards and Guidelines for Municipal Water Supply, Wastewater and Storm Drainage Facilities, latest revision thereof.

- .8 The foundation drain system shall be connected to a separate foundation drain connection and disposal system or to sump pumps.
  - .1 The foundation drain may connect to a sump pump with surface discharge only if the ground water table is more than 1.0 m below the bottom of the foundation drain system.
  - .2 When the ground water table is less than 1.0 metre below the bottom of the foundation drainage system the foundation drains must be either connected directly to a pipe storm sewer system in the street or connected to a sump pump which discharges to a piped storm sewer system in the street.
  - .3 Connection of foundation drains to the sanitary sewer is not permitted.
- .9 Roof leaders shall discharge to ground surface. The discharge shall consist of a concrete splash pad or roof leader extension which directs the water away from the building.

#### 4.2 DESIGN FORMULA

- .1 Storm sewer mains shall be designed in accordance with the Rational Method of Storm Sewer Design and according to the formula of:  
 $Q = KCIA$ ; where  $Q$  = discharge in  $m^3/s$   
 $A$  = area in hectares  
 $I$  = rainfall intensity - millimetres per hour  
 $C$  = run-off coefficient  
 $K$  = 0.00278 Constant
- .2 The intensity of rainfall shall be calculated on the basis of a five-year storm and rainfall curves available for the City of Lethbridge.
- .3 The minimum run-off coefficients shall be:

Agricultural	-	0.15
Residential	-	0.40
Multi-family Residential	-	0.55
Light Industrial	-	0.6
Commercial	-	0.7

#### 4.3 PIPE

- .1 Minimum 300 millimetre diameter for catch basin leads and 300 millimetre diameter for main.
- .2 Minimum pipe cover shall be 1.5 metres.

- .3 Pipe material shall be: Concrete Pipe - ASTM C76 or C655 sulfate resistant;
- .4 Storm sewer pipe shall be designed to convey the design flow when flowing full with the hydraulic gradeline at the pipe crown. All pipe crowns shall match (+.03 mm) at manhole junctions.
- .5 Sewer velocities shall not be less than 0.6 m/s when flowing full. when the flow exceeds 3.0 m/s, special consideration shall be given to protect the displacement of sewer by erosion or shock.

#### 4.4 MANHOLES

- .1 Refer to standards listed under sanitary sewer system. Storm sewer pipe 900 millimetre in diameter and larger shall be constructed using prefabricated manhole tees.
- .2 Manholes shall be installed as per sanitary sewer section 3.3, except that the maximum spacing for pipe size between 750 mm and 1350 mm shall be 150 m. special study is required to determine optimum spacing for pipes greater than 1500 mm.
- .3 Frame and cover shall be a floating style (NF80 or 90) capable of H-20 loading. The following words shall be permanently embossed on the cover: "Storm Sewer".

#### 4.5 CURVED SEWERS AND TRENCHING AND BACKFILLING

For curved sewers, refer to Section 3.7 (Sanitary Sewers).

For trenching and backfilling, refer to Section 3.8 (Sanitary Sewers).

#### 4.6 VIDEO INSPECTION

For video inspection, refer to Section 3.5.3 (Sanitary Sewer). Video inspection shall be required for all storm sewers up to and including 900 mm in diameter.

#### 4.7 CATCH BASINS

- .1 Catch basins shall be of sufficient number, have sufficient inlet capacities and adequate catch basin leads to receive and convey, the calculated storm water flow.

- .2 Catch basins shall be provided to intercept surface run-off and minimize surface run-off along streets to 120 metres.
- .3 All catch basin bodies shall be of precast concrete sections conforming to ASTM C478, and constructed so as to provide a sump to trap rocks and gravel. All concrete is to be sulfate resistant. The catch basin barrel shall be 900 mm ID pipe barrel or a catch basin manhole.
- .4 Catch basin leads shall be installed to provide a minimum depth of cover, from design finished grade, of 1.2 metres unless otherwise approved. The minimum slope on catch basin leads shall be 2%. The minimum size of catch basin lead shall be 300.
- .5 All catch basin leads shall discharge directly into storm sewer manholes. If a lead over 30 m in length is required, a catch basin manhole shall be installed at the upper end.

#### 4.8 DRAINAGE COURSE

A drainage course may be utilized to convey large volumes of storm water under controlled conditions through or past the subdivision.

The Drainage Parkway shall be designed in accordance with the "Objectives for Storm Water Management" as published by Alberta Environment and good engineering practice.

The minimum Drainage parkway cross section shall be as follows:

- 1.0 metre bottom (width may be increased for storm water retention) sloped to drain to a tricle channel to be installed in the bottom. Alternatively a "V" bottom trench is acceptable.
- side slopes shall not be steeper than 4:1.
- 3.0 metres horizontal clearance between top of excavation and property line.

#### 4.9 STORM WATER MANAGEMENT

- .1 Storm water run-off generated from within the subdivision, shall be routed through a storm water management facility as required to regulate the rate of outflow prior to discharge, unless otherwise approved by the Town Engineer and Alberta Environment.

- .2 Storm water management facilities shall be designed in accordance with the "Objectives for Storm Water Management" as published by Alberta Environment and in accordance with good engineering practice.
- .3 Storm water management facilities either wet or dry, shall be designed as part of both the minor (piped) and major (overland) drainage systems. The facilities shall be designed to provide storage, with a minimum 0.3 m freeboard, for all design storms up to and including the 1:100 yr design storms. The volume shall be calculated so that the peak discharge from the facility for any given design storm up to 1:100 yrs return period at ultimate development conditions is equal to or less than the pre-development peak discharge rate for that design storm. The design volume shall be the largest volume calculated using various design storms up to and including a 24 hour design storm event.
- .4 Dry storm water management facilities are those which contain water during and immediately after a runoff event and which are dry at all other times, and shall be designed to provide:
  - a low flow bypass for minor events
  - a minimum longitudinal bottom slope of 0.5%
  - a minimum lateral bottom slope of 1.0%
  - side slopes flatter than 5 (horizontal) to 1 (vertical)
  - have gratings on inlet and outlet to prevent access by children
  - provide an emergency overflow.
- .5 Wet storm water management facilities are those facilities which contain water at all times and shall be designed to provide:
  - a minimum depth of 2.5 m at normal water level.
  - side slopes no greater than 3 (horizontal) to 1 (vertical) from the bottom of the pond to one metre below normal water level; 7 (horizontal) to 1 (vertical) from one metre below normal water level to 5 metre (horizontal) beyond the 1:100 yr flood level.
  - non-erodible shore line protection from 1.5 m (horizontal) below normal water level to 3.0 m (horizontal) above normal water level, this protection shall be compatible with adjacent land use, consider safety and maintenance and shall be acceptable to the Town Engineer.
  - have inlets and outlets below ice level or a minimum of 1.0 metre below normal water level.
  - have no dead bay areas
  - address all safety issues

- provide an emergency overflow.
- .6 Inlet and outlet structures, acceptable to the Town Engineer shall be incorporated in storm water management facilities as required.
- .7 Debris collection chambers, acceptable to the Town Engineer, shall be incorporated where applicable.
- .8 Access to the facilities for maintenance and sediment removal must be provided.
- .9 A minimum of 3 metres horizontal clearance between top of excavation and property line shall be provided.
- .10 The complete area of storm ponds shall be landscaped in accordance with the standards listed under landscaping.
- .11 Fencing, of a type approved by the Town Engineer, shall be required around ponds.

## **5.0 SUBDIVISION GRADING**

### **5.1 PRE-GRADING**

Lots shall be pre-graded to design grade or 300 millimetres below design grade.

### **5.2 PLANS**

The plans submitted by the Developer's Engineer shall indicate the following information:

- .1 Existing and proposed lot corner grades.
- .2 Minimum ground elevation at the building.
- .3 Invert of sanitary sewer service.
- .4 Location of service connection.
- .5 Direction of drainage.
- .6 The proposed and existing grades for the Public lands (reserves, buffers, and boulevards).

A common drawing (Lot Grading Plan) may be used to consolidate this information.

### 5.3 DESIGN

In general, the lots shall be graded to achieve a minimum slope of 2% over the lot and the area within 1.5 m of the building foundation at 5%.

In cases where the backyard slopes towards the building, provisions are required to keep the run-off at least 3 metres away from the rear of the building with the possibility of draining the surface water along the lot lines onto the street.

Reserves, and public lands shall be graded to drain towards developed streets, lanes, and/or storm sewer catch basins.

## \* 6.0 ROADWAYS

### 6.1 ROADS RIGHTS-OF-WAY

Rights-of-way shall be of adequate width to accommodate the carriageway, sidewalks, boulevards, underground utilities, street lighting, etc. in an acceptable manner. Easements will be as required.

Minimum rights-of-way requirements are as follows:

.1	Lanes .....	6 metres
.2	Minor Residential Roads .....	15 metres
.3	Local Roads - Residential .....	17 metres
	- Commercial/Industrial .....	20 metres
.4	Collector Roads	
	- Residential - minor .....	20 metres
	- major .....	24 metres
	- Commercial/Industrial .....	24 metres
.5	Arterial Roads .....	30 metres

### 6.2 GEOMETRIC DESIGN

Roads shall be designed in accordance with the geometric design standards outlined in the latest edition of the "Geometric Design Standards for Canadian Roads and Streets", Roads and Transportation Association of Canada.

In addition, roads shall be designed in accordance with the following geometric design standards:

	Minor Residential	Local Roads	Collector Roads	Arterial Roads
			Minor    Major	
No. of Housing Units	up to 25	25-100	Over 100	
Estimated Daily Traffic	250	250-1000	1000    2000	over 3000
Min. Design Speed (kilometre/hour)	40	50	50	60
Min. Crown (millimetres)	150	150	200	200
Min. Pavement Width (Metres)	8.5	9	11	2 @ 7.5
Min Radium (metres)	75	75	150	225
Super Elevation	No	No	Optional 6% Max	Yes 6% Max.
Min. Curve Lengths (metres)	60	60	150	240
Max. Gradient	7%	7%	6%	5%
Min. Gradient*	0.5%	0.5%	0.5%	0.5%
Min. Tangent Section Lengths (metres)	30	30	60	150
Min. Intersection Spacing (metres)	60	60	60	400
Min. Curb Return Radii (metres)	8	8	10	15

### 6.3 CLEARING AND GRUBBING

Clearing and grubbing along street and lane rights-of-way shall be limited to the working area required to install the proposed local improvements.

Any clearing undertaken shall be in accordance with "approved" landscape drawings for the entire subdivision.

#### 6.4 STRIPPING TOPSOIL

Topsoil shall be stripped of road rights-of-way and trenching area to its full depth.

The topsoil when used as fill shall be placed such as to add to existing topsoil thereby utilizing it for landscaping purposes.

Surplus topsoil is to be stockpiled for use in final grading of parks, boulevards, buffer strips, and developed lots.

#### 6.5 RIGHT-OF-WAY GRADING

The grading of the streets and lanes shall be compatible with the overall grading of the lots and public lands within the subdivision.

The area between back of curb or sidewalk and property line shall be graded to provide a uniform slope (2% minimum) from top of concrete to finished grade at the property line as established on the lot grading plan.

#### 6.6 SUB-GRADE CONSTRUCTION

The sub-grade shall be excavated or filled to the required grade over the full width of the roadway. Where earthfill is required it shall be placed in lifts not exceeding 150 millimetres in depth and each lift shall be thoroughly compacted to a minimum of 97% of Standard Proctor Density.

The sub-grade shall be graded to conform to the required longitudinal grade and crown of the roadway and the top 150 millimetres depth shall be compacted to 100% of Standard Proctor Density.

#### 6.7 BASE COURSE CONSTRUCTION

The base course shall not be less than the equivalent to that given below or an alternative design as approved by the Town Consulting Engineer to meet sub-grade and traffic requirements. Refer to design of pavement.

	<u>Residential</u>	<u>Commercial/Industrial</u>	
<del>Crushed Gravel</del>	300 mm	400 mm	PIT RUN - 6"
<del>Asphalt</del>	100 mm	125 mm	CRUSHED GRAVEL 3/4"

## 6.8 PAVEMENT DESIGN

Paved roadways shall be designed in accordance with the Asphalt Institute method of pavement design using the maximum traffic loadings to be expected within the next 20 years. The design parameters such as traffic count, percentage of trucks, California Bearing Ratio (CBR) etc., are to be outlined to the Town Engineer.

The Developer shall engage a soils testing firm to carry out CBR tests on the completed sub-grade and confirm adequacy of the pavement design. The developer shall submit a geotechnical report including detailed road structure design calculations as part of the submission of engineering drawings.

## 6.9 ASPHALT SURFACE

Asphalt surface shall not be laid until the base course has been inspected and approved by the Town Engineer.

Asphalt materials, mixing, spreading and rolling shall conform to good practice.

The asphalt hot mix concrete pavement shall meet the following test requirements based on the 75 Blow Marshall Method.

<u>Test</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Units</u>
Marshall Stability	4.5	-	-
Flow	8	16	kN
% Voids Total Mix	3	5	Units of 0.25 mm
% Voids in Mineral Aggregate	14	-	-

A minimum compacted thickness of asphaltic concrete shall be:

### Residential

Local & Minor Roads	<del>50 mm</del>
Collectors & Arterials	75 mm

### Commercial/Industrial

Local Roads	75 mm
Collector & Arterials	100 mm

## 6.10 TOLERANCES

### .1 Thickness

A minimum compacted thickness of 50 mm of hot mix asphalt concrete shall be placed on all streets unless specified otherwise. Pavement structure shall be constructed to the minimum thickness specified. Pavement deficient in thickness by 13 mm or more shall be removed and replaced at the Contractor's expense. For pavement found deficient by more than 3 mm but less than 13 mm, the adjusted unit rate shall have the same ratio to the contract unit price that the square of the average thickness found has to the square of the specified thickness. No adjustments will be made for thickness greater than specified.

### .2 Density

The mixture shall be compacted immediately after spreading to a minimum density of not less than 98% of the 75 Blow Marshall compaction test. Asphalt which fails to meet the density specified shall be removed and replaced at the Contractor's expense or a reduced payment may be substituted, as follows:

<u>% of 75 Blow Marshall Density</u>	<u>% Payment Reduction</u>
98.0 and over	0
97.0 - 97.9	15
96.0 - 96.9	15
95.0 - 95.9	30
94.0 - 94.9	50
Below 94.0	Replace

### .3 Complete Pavement

The complete pavement shall have a tightly knit structure and be free from segregation and surface cracking.

## 6.11 LANES

Back lanes shall be provided for lots fronting directly on to Collector and Arterial roads.

Lanes shall be graded, as outlined for sub-grade construction.

Lanes shall be paved surface with a minimum of 75 millimetres of asphalt with a 5 metres wide driving surface.

The structure for lanes shall be designed to provide capacity for a fully loaded twin axle garbage truck.

## **7.0 CURBS AND GUTTERS**

### **7.1 TYPE AND LOCATION**

Curb and gutter shall be constructed on one or both sides of the roadway as follows:

- .1 Residential Streets - rolled face curb and gutter with monolithic sidewalk.
- .2 Collector Streets - vertical face curb and gutter with monolithic or separate sidewalk.
- .3 Arterial Streets - vertical face curb and gutter separate of the sidewalk.

### **7.2 CONCRETE**

Concrete shall be 25 MPa, 5% to 8% air entrained.

### **7.3 CURB RETURNS**

At street intersections, curb and gutter shall be constructed to a radius as per section 6.2. Minimum curb radius within cul-de-sacs shall be 12 metres.

### **7.4 SWALE GUTTERS**

The use of swale gutters shall be limited to minor and residential streets.

Swale gutter cross-section shall be a minimum of 1 metre wide and 200 millimetres thick with steel reinforcing.

## **8.0 SIDEWALKS**

### **8.1 REQUIREMENT**

- .1 Sidewalks shall be provided on one side of residential, collectors and arterials.**
- .2 Sidewalks shall be constructed adjacent to school sites and commercial sites.**
- .3 Sidewalks shall be constructed on all other lands that, in the opinion of the Engineer, generate significant pedestrian traffic.**
- .4 Sidewalks shall be stamped with the year of installation and the name of concrete contractor at roadway intersections.**
- .5 Sidewalks shall be stamped with "CC" along the back edge of the sidewalk immediately opposite all curb stop locations. The "CC" stamp shall be placed on the top of the curb in areas where no sidewalk is installed.**

### **8.2 DIMENSIONS**

**Sidewalks shall be a minimum width of 1.25 metres except when required on Arterial Roads and collectors, the sidewalk shall be 1.5 metres. In commercial areas the minimum width shall be 1.5 metres.**

**Normal thickness shall be 100 millimetres minimum.**

**All lanes and commercial, public or institutional crossings shall be minimum of 175 millimetres thick and reinforced with steel rebar.**

**Construction joints shall be marked at intervals of 1.5 metres.**

**Sidewalks and curbs shall be depressed at street intersections to permit easy passage of carriages and wheelchairs.**

### **8.3 FINISHING**

**Sidewalks shall be edged and brush finished.**

### **8.4 CONCRETE**

**Concrete shall be 25 MPa, 5% to 8% air entrained.**

### **8.5 GRADES**

**Grades shall be provided by the Developer's Engineer.**

Sidewalk cross-slope down to the curb shall be consistent within 2 to 3% minimum-maximum limits except at lanes and crossings.

**8.6 BASE**

Sub-grade shall be graded or filled to the required grade and cross section of sidewalk.

Where fill is required, it shall consist of approved material compacted to a minimum of 95% Standard Proctor Density.

**9.0 LANDSCAPING**

**9.1 AREAS**

Areas within the subdivision to be landscaped are buffer strips, drainage parkways, reserves and public utility lots.

**9.2 SCOPE**

Landscaping shall be the final grading of the areas to comply with the Lot Grading plan; the placing and spreading of topsoil the cultivation of the area, planting it to grass and treeing; all in accordance with the landscaping plans.

**9.3 GRADES**

Boulevards and Buffer Strips shall be graded to drain over the curbs into the street gutters.

Reserves shall be graded to drain over the adjacent curbs into the street gutters or into catch basins within the reserve, or into adjacent Drainage Parkways.

**9.4 SEEDING**

Designated areas with the subdivision area shall be pre-graded, filled to final grade to provide a minimum of 100 millimetres of topsoil, and seeded to a variety of grass approved by the Municipality.

## 9.5 SOUND ABATEMENT

Berms or elevated contoured embankments shall be utilized for sound abatement along arterial roads, Highways and/or railways as required by the regulatory authorities.

The subdivision side of the embankments shall be with gentle slopes; minimum of 4:1.

## 9.6 TREES

Native trees within the subdivision are to be preserved to the maximum extent possible.

Trees shall be planted on all buffer strips to a spacing of either 1 tree per 100m<sup>2</sup> of area or to a maximum spacing of 12 metres.

Trees shall be planted on all reserves to a density which is compatible to the intended use of the reserve and in accordance with landscaping plans approved by the Town.

Trees shall be a mixture of bush type shrubs (minimum height of 1 metre) and trees (minimum height of 2 metres). The trees and shrubs shall be a mixture of local evergreens, deciduous and ornamental trees and shrubs.

## 9.7 UTILITY SERVICE

One sanitary sewer and water service, complete with surface connection, shall be installed at an approved location to each designated reserve area involving playground or public use.

One water service only, complete with surface connection for irrigation purposes is required for ornamental parks.

Water service is to be a minimum of 19 millimetre in diameter and 1 service/hectare.

## 9.8 PERIMETER FENCES

A uniform fence shall be provided along the perimeter of the subdivision adjacent to Arterial roads, Highways and Railroads.

A uniform fence shall be provided along the perimeter of municipal reserves.

The fence shall be of sturdy construction, minimum 1.5 metres high, of a design suitable of sound abatement, and a type that requires minimum maintenance.

## 10.0 STREET LIGHTING

### 10.1 INSTALLATION

TransAlta guidelines for design and installation of street lighting shall govern street light installation complete with fixture as per the Local Power Utility Standard.

### 10.2 COSTS

Any capital contribution that the utility company may charge for installation of underground street lighting, shall be paid for by the Developer.

The Town will pay rental charges to the utility company providing street lighting, for the operation of street lights thus installed after the Final Acceptance Certificate is issued.

### 10.3 LOCATION

Street lights shall be placed at locations not interfering with proposed driveways and in general shall be located in line with the extension of common property lines between two lots.

The face of the posts shall be at least 1.5 metres clear of the face of the curb or 0.3 metres of the back of the sidewalk or as approved by the Town and the Local Power Utility.

Street lights shall be provided for each internal park area that does not abut onto a lighted street. A street light shall be located at the point where each walkway opens onto the park area.

Street lights with underground wiring shall be provided for all public walkways which are not in street right-of-way and in which in addition are not located immediately adjacent to private dwelling units or public housing.

## **11.0 TRAFFIC CONTROL, DEVICES AND STREET NAME SIGNS**

### **11.1 TRAFFIC SIGNS**

Standard traffic signs and traffic control devices shall be installed by the Developer and shall be in accordance with the Manual of Uniform Traffic Control Devices of the Roads and Transportation Association of Canada.

### **11.2 STREET SIGNS**

Reflectorized street name signs, of the type and colour, satisfactory to the Town mounted on 50 millimetre diameter metal posts shall be installed by the Developer as per "Approved" Traffic and Street signs drawing.

## **12.0 GAS, POWER, CABLE TELEVISION AND TELEPHONE SERVICES**

### **12.1 INSTALLATION**

The gas, power, cable television and telephone services to be installed shall be arranged and coordinated by the Developer with the respective utility companies. On asphalt surfaces, conduits will be installed where possible.

### **12.2 COST**

Any cost for these services charged by the respective utility companies, shall be paid by the Developer.

### **12.3 RIGHT-OF-WAY**

The Developer shall provide either registered rights-of-way or registered easements in the name of the Town for the purpose of accommodating the utility services. Rights-of-way shall be of sufficient width and satisfactory to the utility companies.

Easements shall be registered on each individual lot prior to the sale of any lot in the development area.

### **13.0 RAILROAD SPUR LINES**

#### **13.1 INSTALLATION**

Any railroad spur lines to be installed shall be arranged for and coordinated by the Developer with the appropriate railroad authorities.

All layouts and installations shall be subject to the approval of the Town Engineer.

#### **13.2 COST**

All costs for railroad spur lines shall be paid by the Developer.

#### **13.3 RIGHT-OF-WAY**

The Developer shall register spur line easements on the properties abutting railroad mainline trackage.

### **14.0 SURVEY CONTROL MONUMENTS**

The developer shall pay a fee of \$250/ha to the Town to cover the costs of installation of the survey control network. The network will be installed once the subdivision has been built out.

## **15.0 STANDARD DETAILS**

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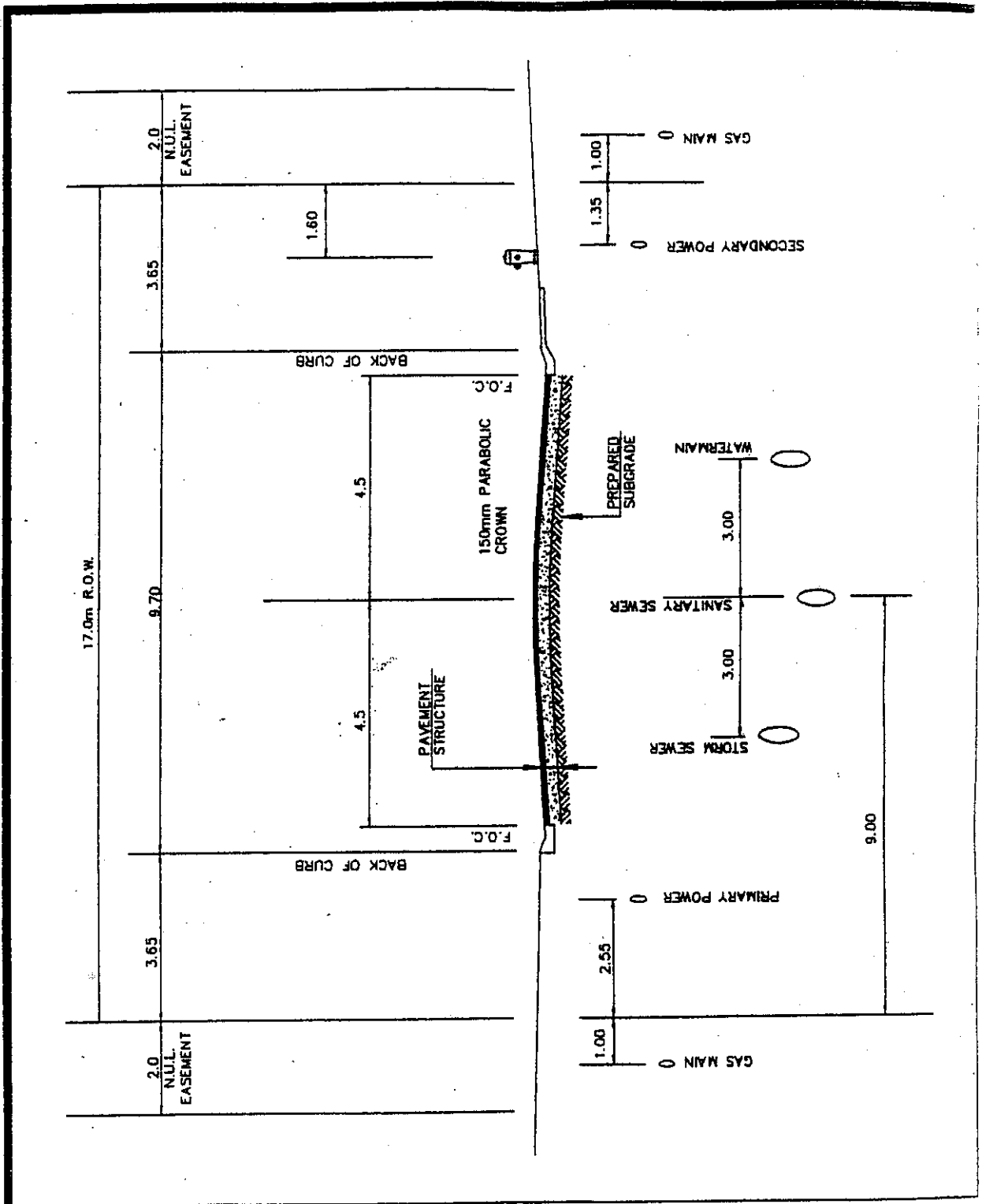
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**DIVISION 1**

**ROAD, SIDEWALK, CURB & GUTTER  
DETAILS**

AutoCAD File : R-101.DWG  
 Last Edit Date: 9/5/05/13



PROJECT NO. \_\_\_\_\_  
 DATE \_\_\_\_\_ MAY, 1993  
 APPROVED \_\_\_\_\_ R.M.  
 SCALE \_\_\_\_\_ N.T.S.  
 DWG. No. \_\_\_\_\_ R-101

TOWN OF TABER  
 STANDARD DETAILS

LOCAL ROAD - RESIDENTIAL

The drawing illustrates a street cross-section with a total width of 15.0m R.O.W. The layout includes the following components from left to right:

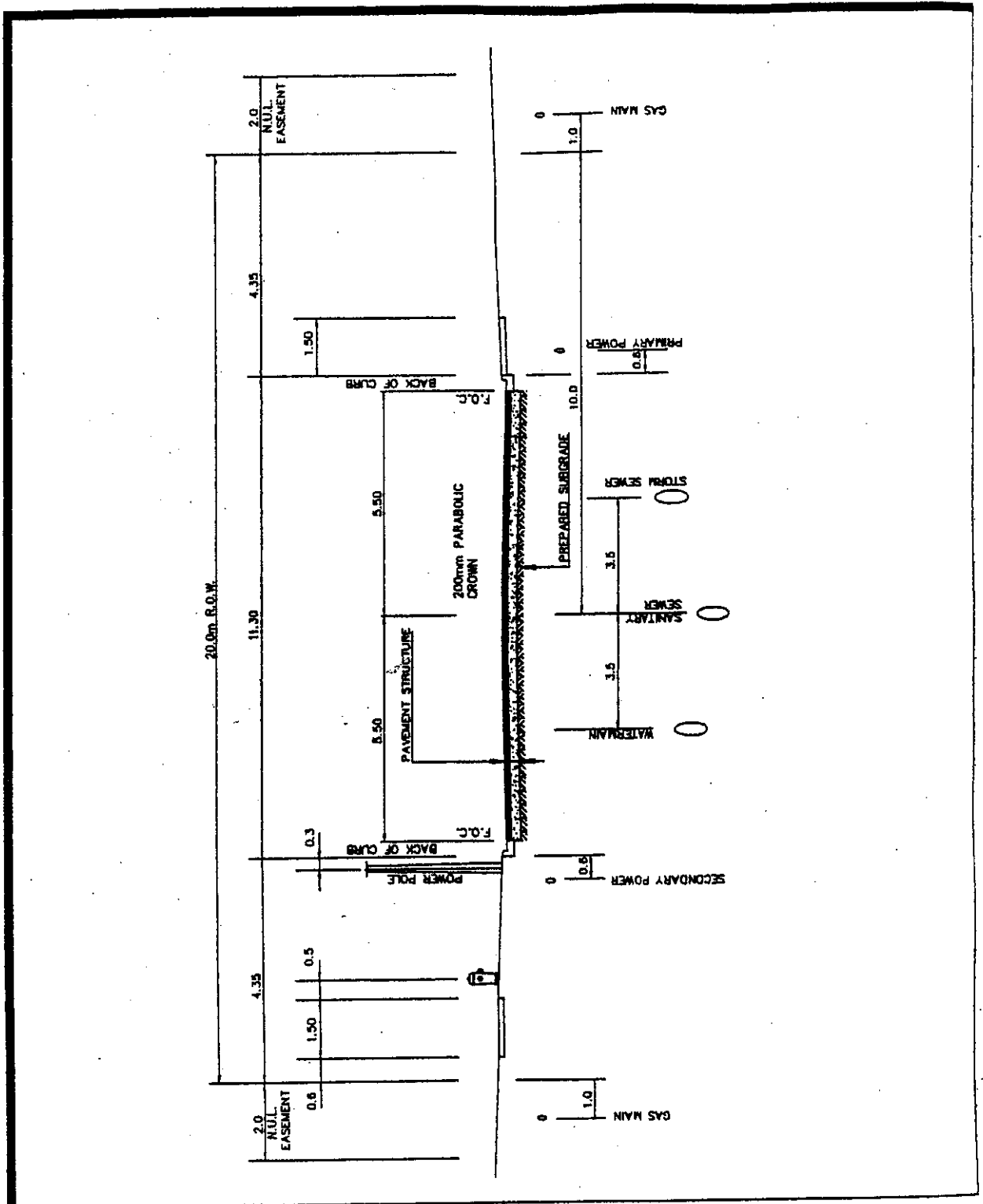
- Left Side:** A 2.0m NUL. EASEMENT, followed by a 2.90m wide area, and another 2.0m NUL. EASEMENT.
- Center Area:** A 9.20m wide section containing:
  - A 1.60m wide area on the left.
  - A 4.25m wide area labeled "PAVEMENT STRUCTURE".
  - A 4.25m wide area labeled "150mm PARABOLIC CROWN".
  - A 4.25m wide area on the right.
- Right Side:** A 2.90m wide area, followed by a 2.0m NUL. EASEMENT.

Utility lines and structures are shown below the pavement structure:

- PAVED SUBGRADE:** Indicated by a hatched pattern below the pavement structure.
- WATER MAIN:** Located 3.00m from the left edge of the paved subgrade.
- SANITARY SEWER:** Located 3.00m from the water main.
- STORM SEWER:** Located 3.00m from the sanitary sewer.
- Utility Lines:** GAS MAIN (1.00m from left edge), PRIMARY POWER (2.55m from left edge), and SECONDARY POWER (1.35m from left edge).

PROJECT NO. _____	TOWN OF TABER STANDARD DETAILS	
DATE _____ MAY, 1993		
APPROVED _____ R.M.		
SCALE _____ N.T.S.		
DWG. No. _____ R-102	MINOR ROAD - RESIDENTIAL	

AutoCAD File : R-103.DWG  
 Last Edit Date: 93/05/13

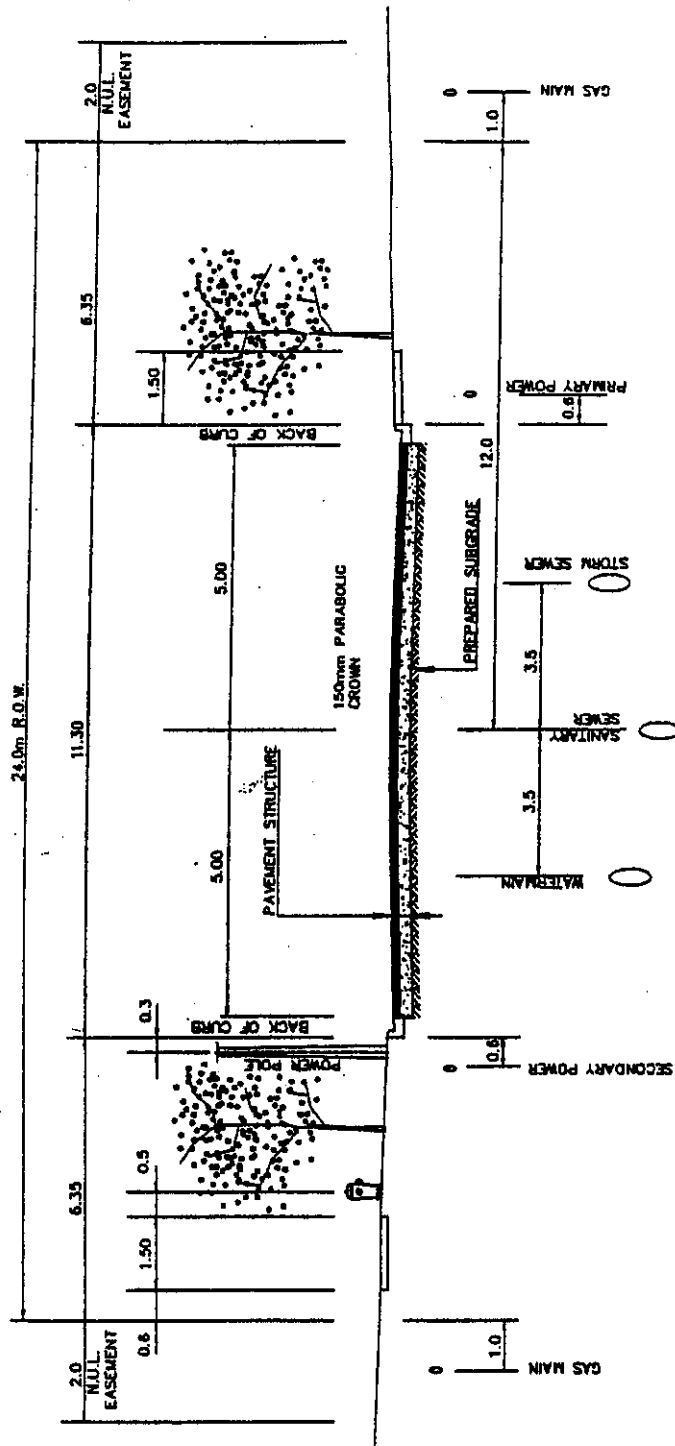


PROJECT NO. \_\_\_\_\_  
 DATE MAY, 1993  
 APPROVED R.M.  
 SCALE N.T.S.  
 DWG. No. R-103

TOWN OF TABER  
 STANDARD DETAILS

MINOR COLLECTOR ROAD - RESIDENTIAL

AutoCAD File : R-104.DWG  
 Last Edit Date: 93/05/13

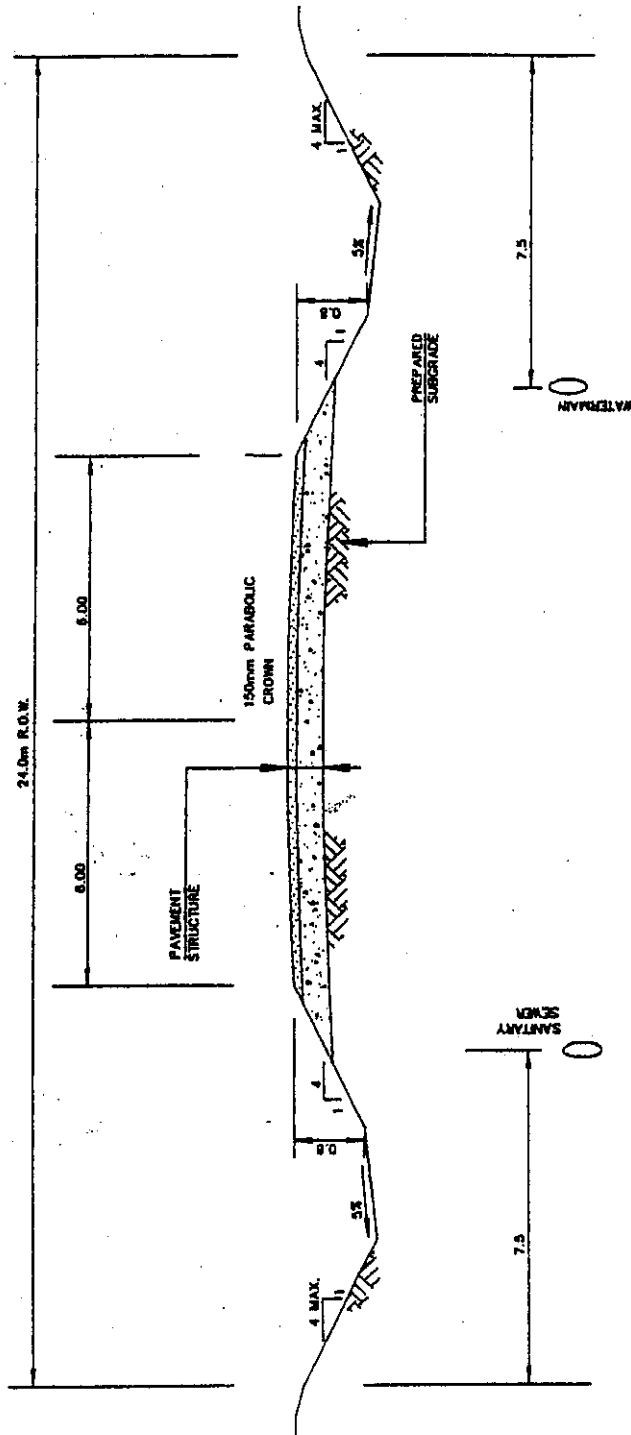


PROJECT NO. \_\_\_\_\_  
 DATE \_\_\_\_\_ MAY, 1993  
 APPROVED \_\_\_\_\_ R.M.  
 SCALE \_\_\_\_\_ N.T.S.  
 DWG. No. \_\_\_\_\_ R-104

# TOWN OF TABER STANDARD DETAILS

MAJOR COLLECTOR ROAD - RESIDENTIAL

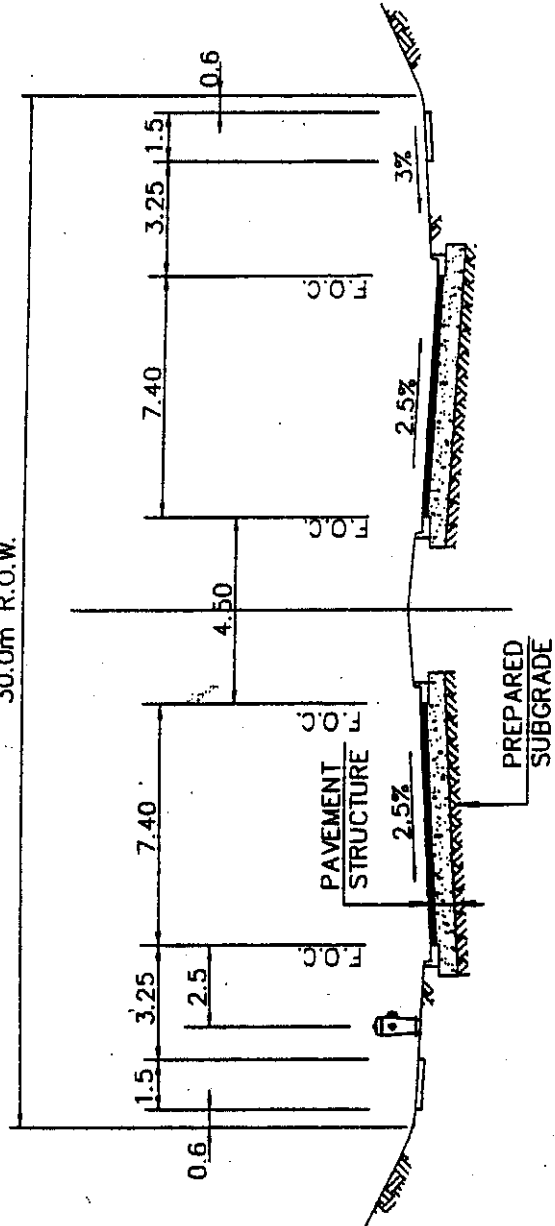
AutoCAD File : R-105.DWG  
 Last Edit Date: 93/05/18



PROJECT NO. _____	TOWN OF TABER	
DATE _____ MAY, 1993	STANDARD DETAILS	
APPROVED _____ R.M.		
SCALE _____ N.T.S.	INDUSTRIAL ROAD	
DWG. No. _____ R-105		

AutoCAD File : R-106.DWG  
 Last Edit Date: 93/05/13

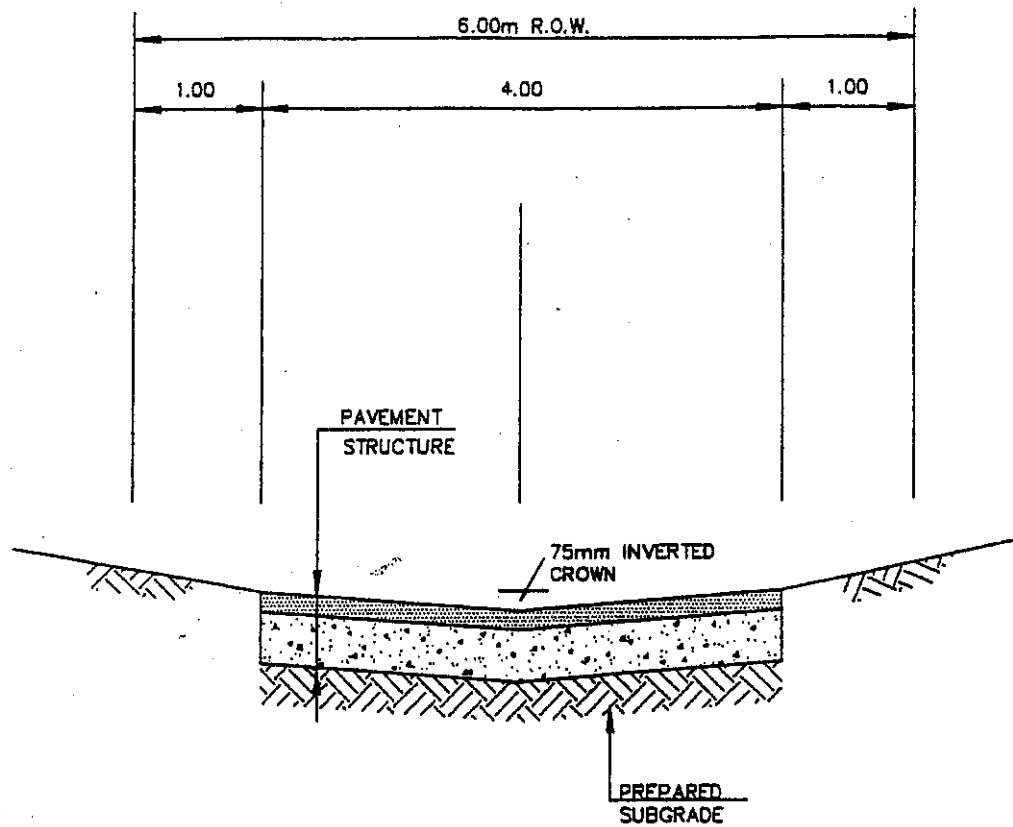
30.0m R.O.W.



PROJECT NO. \_\_\_\_\_  
 DATE \_\_\_\_\_ MAY, 1993  
 APPROVED \_\_\_\_\_ R.M.  
 SCALE \_\_\_\_\_ N.T.S.  
 DWG. No. \_\_\_\_\_ R-106

TOWN OF TABER  
 STANDARD DETAILS  
 ARTERIAL ROAD

AutoCAD File : R-107.DWG  
Last Edit Date: 93/05/14

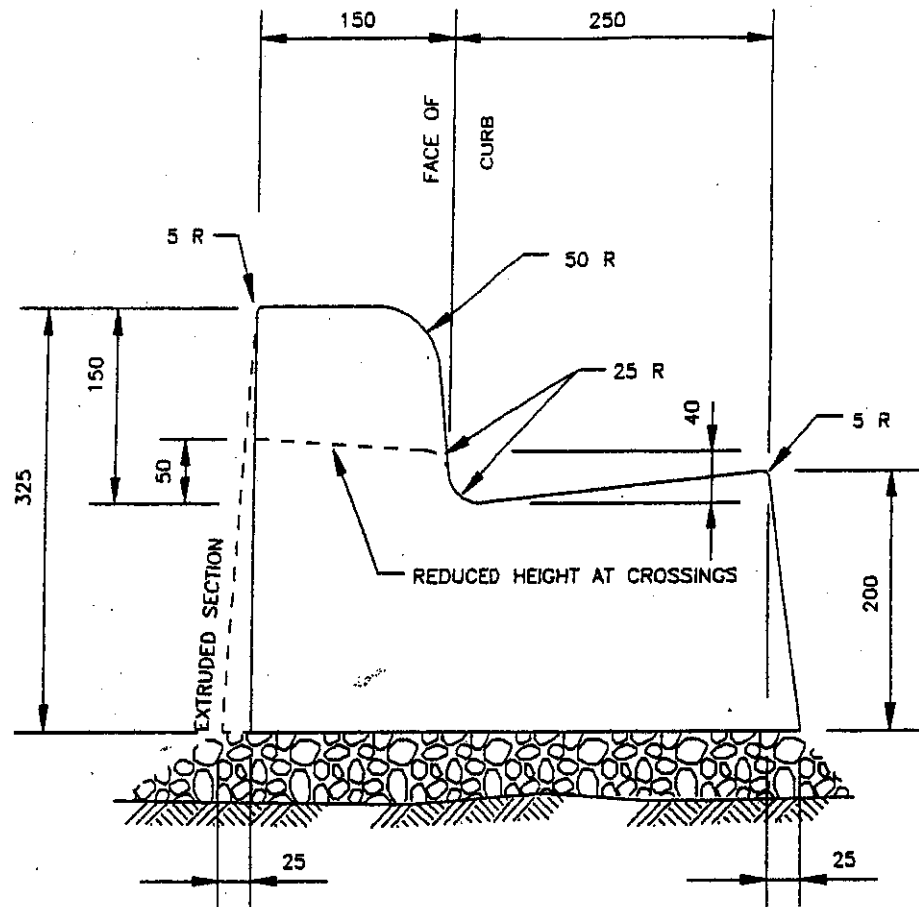


PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-107

TOWN OF TABER  
STANDARD DETAILS

TYPICAL LANE

AutoCAD File R-108.DWG  
Last Edit Date 05/14

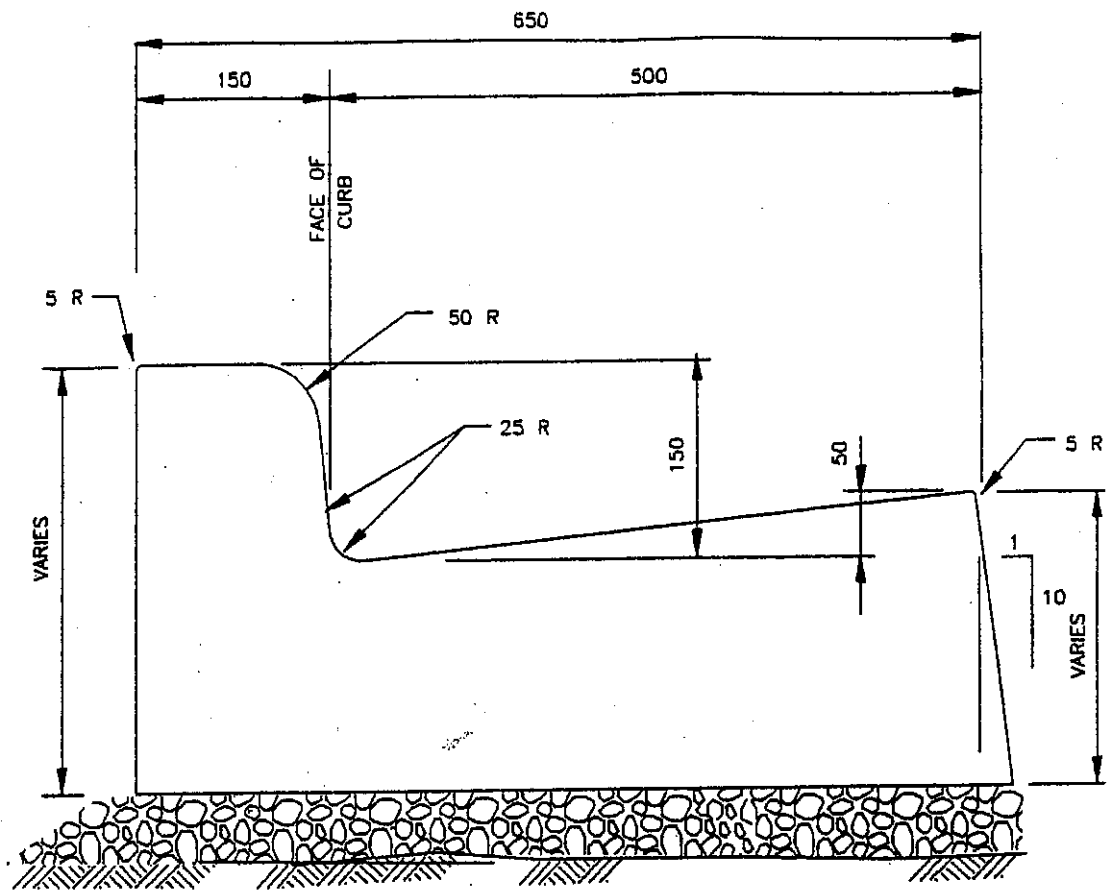


PROJECT NO. \_\_\_\_\_  
DATE MAY, 1993  
APPROVED R.M.  
SCALE N.T.S.  
DWG. No. R-108

TOWN OF TABER  
STANDARD DETAILS

150 mm CURB AND 250 mm GUTTER

AutoCAD File R-109.DWG  
Last Edit Date 03/05/14

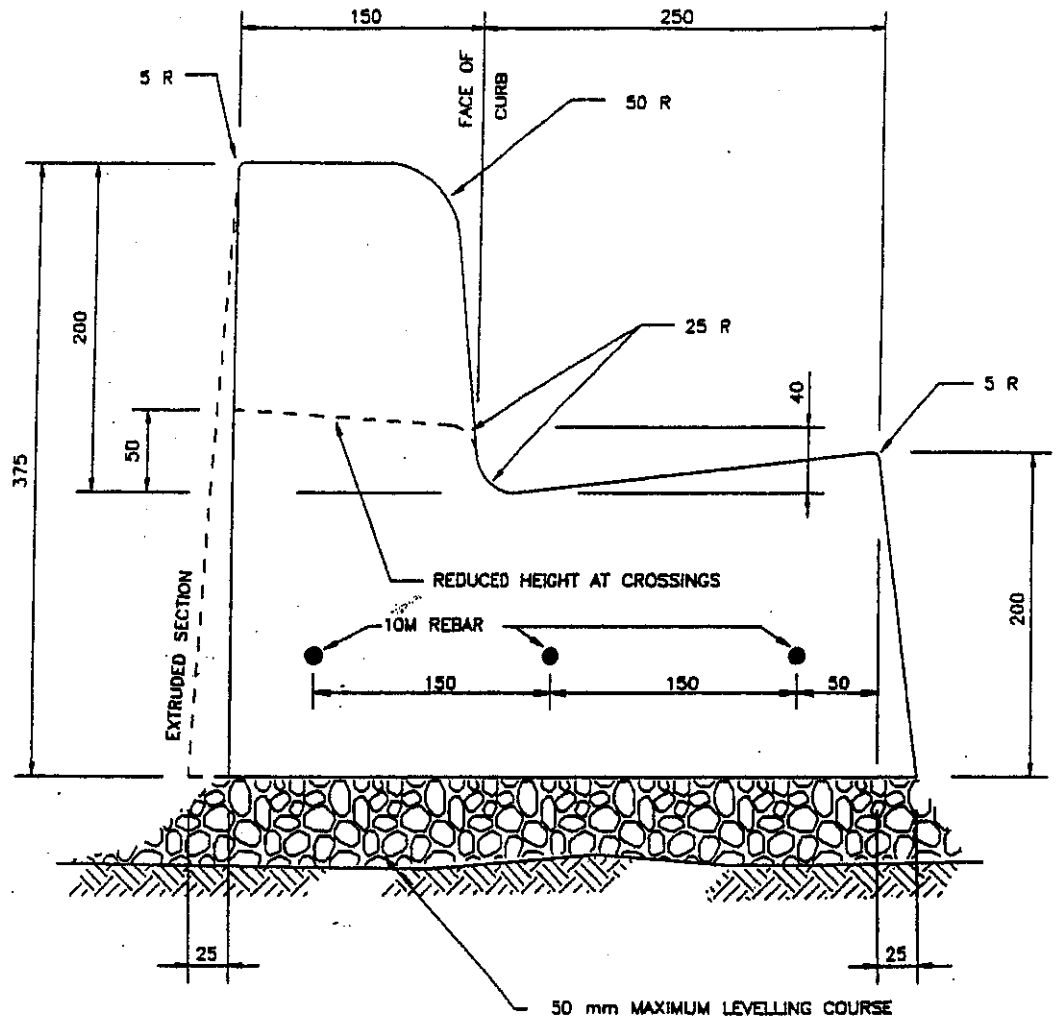


NOTE: DEPTH OF GUTTER FACE TO MATCH DEPTH OF ROAD STRUCTURE.

PROJECT NO. \_\_\_\_\_  
DATE MAY, 1993  
APPROVED R.M.  
SCALE N.T.S.  
DWG. No. R-109

TOWN OF TABER  
STANDARD DETAILS

150 mm CURB AND 500 mm GUTTER



NOTES:

- REDUCED CURB HEIGHT AT ALL CROSSINGS.
- 3-10M REBAR AT ALL LANE AND COMMERCIAL CROSSINGS.
- WHERE PLACED OVER DISTURBED SOIL, USE GRANULAR MATERIAL, COMPACTED TO 95 % STANDARD PROCTOR.

PROJECT NO. \_\_\_\_\_

DATE \_\_\_\_\_ MAY, 1993

APPROVED \_\_\_\_\_ R.M.

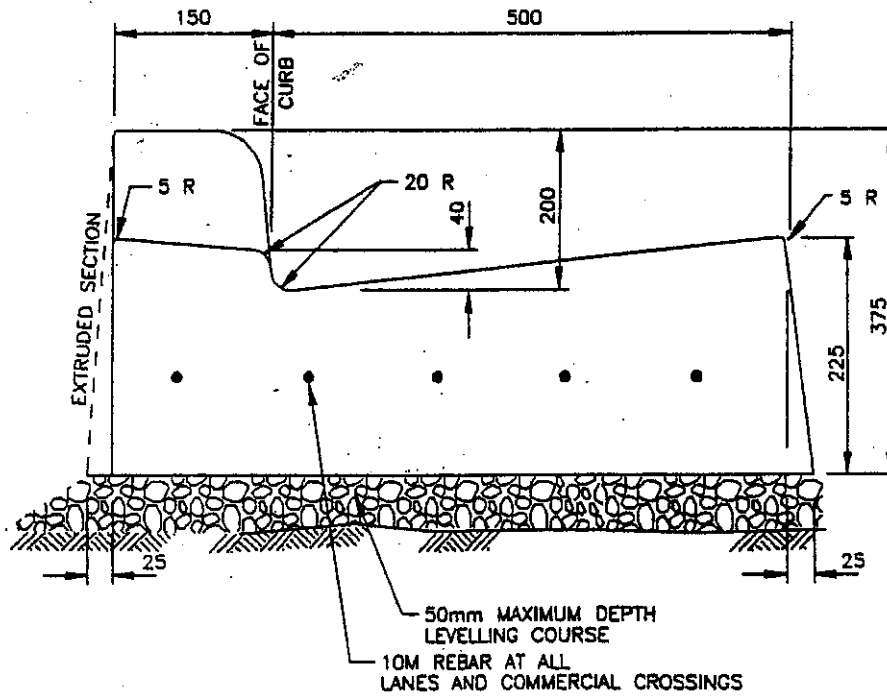
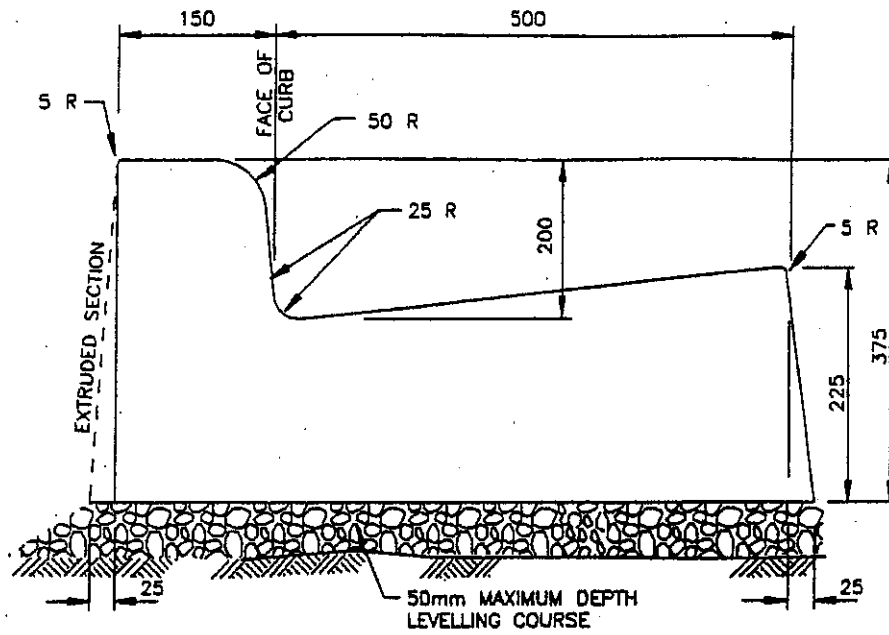
SCALE \_\_\_\_\_ N.T.S.

DWG. No. \_\_\_\_\_ R-110

TOWN OF TABER

STANDARD DETAILS

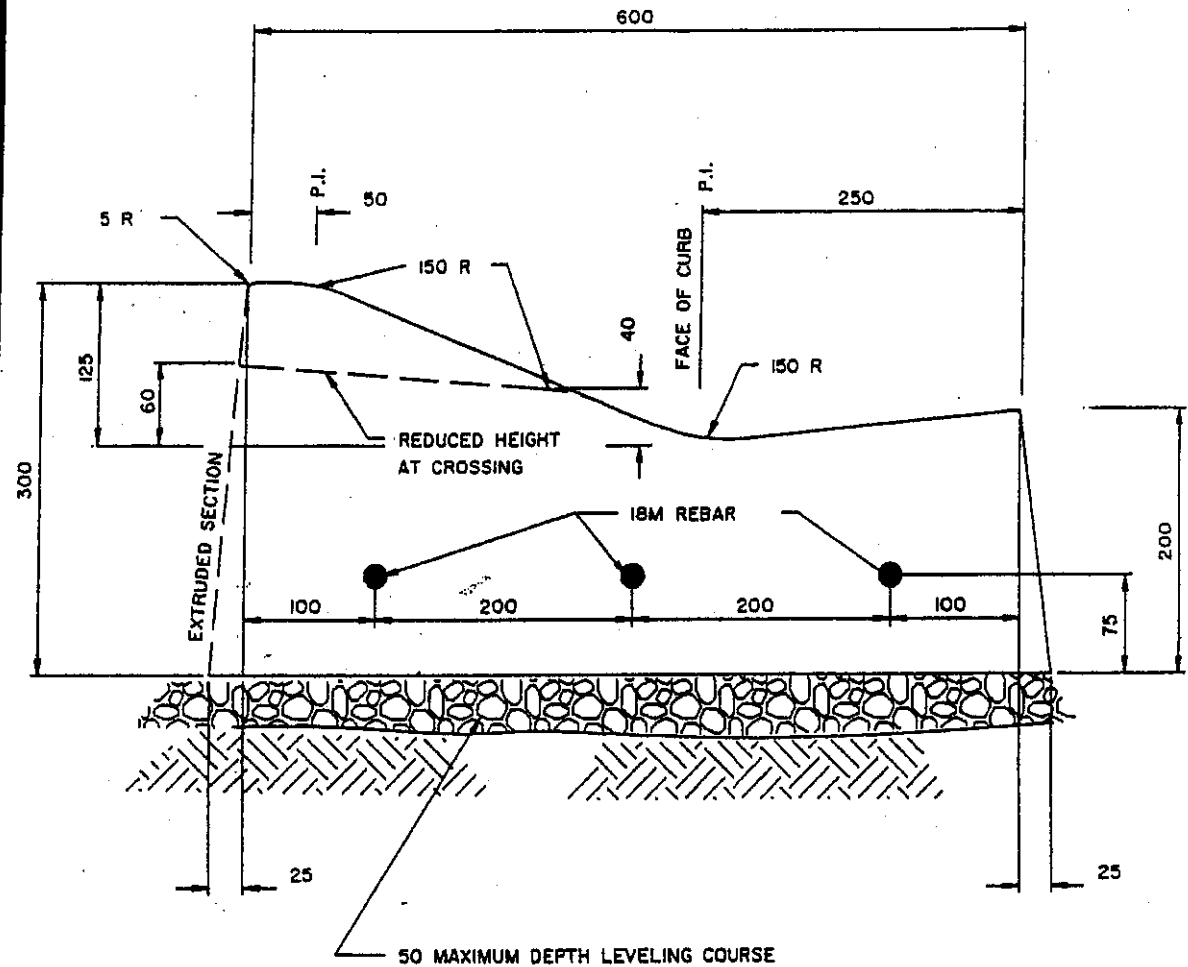
200 mm CURB AND 250 mm GUTTER



PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-111

TOWN OF TABER  
STANDARD DETAILS

200 mm CURB AND 500 mm GUTTER



**NOTE:**

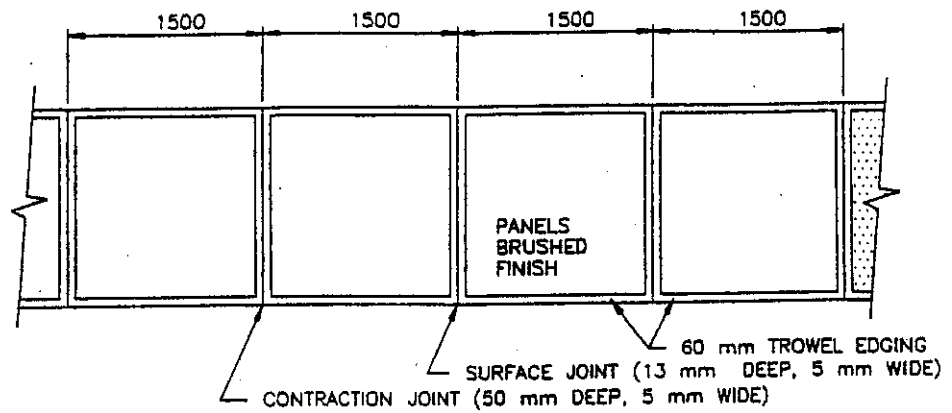
- REDUCE CURB AT ALL LANE, COMMERCIAL AND EXISTING PRIVATE CROSSINGS.
- 3-18M REBAR AT ALL LANE AND COMMERCIAL CROSSINGS ONLY.
- ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-112

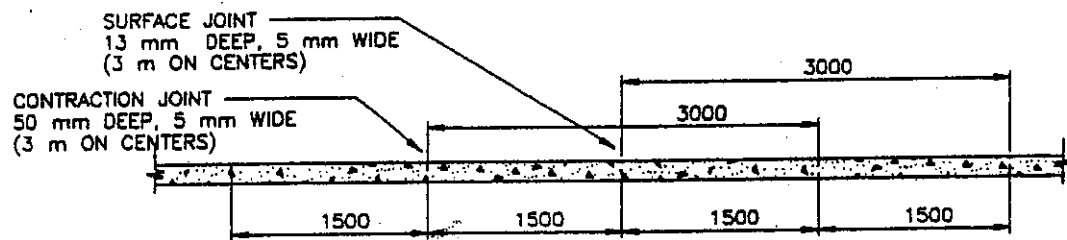
TOWN OF TABER  
STANDARD DETAILS

ROLLED FACE CURB AND GUTTER

AutoCAD File : R-113.DWG  
Last Edit Date: 93/05/18

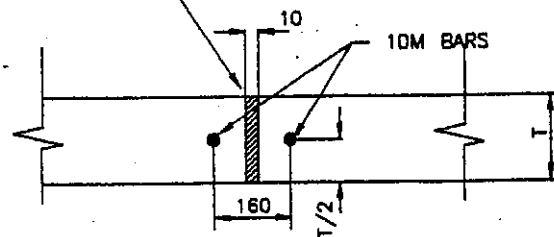


PLAN



SECTION

EXPANSION JOINT MATERIAL  
FULL WIDTH AND THICKNESS  
OF STRUCTURE



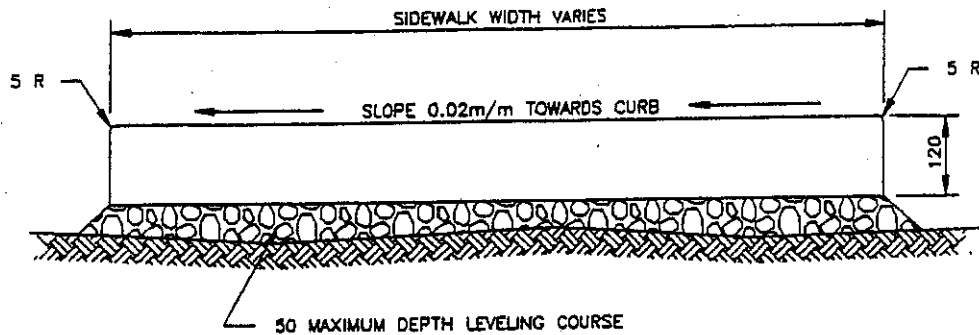
EXPANSION JOINT DETAIL

PROJECT NO. \_\_\_\_\_  
DATE MAY, 1993  
APPROVED R.M.  
SCALE N.T.S.  
DWG. No. R-113

TOWN OF TABER  
STANDARD DETAILS

SIDEWALK JOINT AND  
FINISHING DETAILS

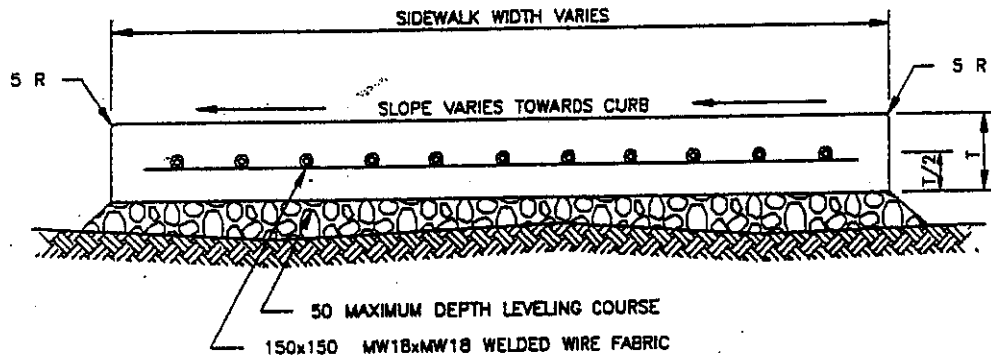
AutoCAD File : R-114.DWG  
Last Edit Date: 93/05/14



**NOTE:**

- ELEVATION OF FRONT OF WALK TO BE SET SUCH THAT A MINIMUM SLOPE OF 0.02 m/m IS MAINTAINED ACROSS BOULEVARD BETWEEN FRONT OF WALK AND TOP OF CURB.

**TYPICAL SECTION**



**NOTES:**

- THICKNESS "T" = 150 FOR PRIVATE CROSSINGS.
- THICKNESS "T" = 180 FOR LANE AND COMMERCIAL CROSSINGS.
- 0.02 m/m MINIMUM CROSS SLOPE FOR ALL CROSSINGS.
- WHERE SLOPE BETWEEN TOP OF DEPRESSED CURB CROSSING AND FRONT OF WALK WOULD EXCEED 0.08 m/m FOR PRIVATE (0.04 m/m FOR LANE AND COMMERCIAL CROSSINGS), SIDEWALK CROSSINGS SHALL BE DEPRESSED SUCH THAT MAXIMUM SLOPE ACROSS BOTH BOULEVARD AND SIDEWALK DOES NOT EXCEED 0.08 m/m (0.04 m/m FOR LANE AND COMMERCIAL CROSSINGS).

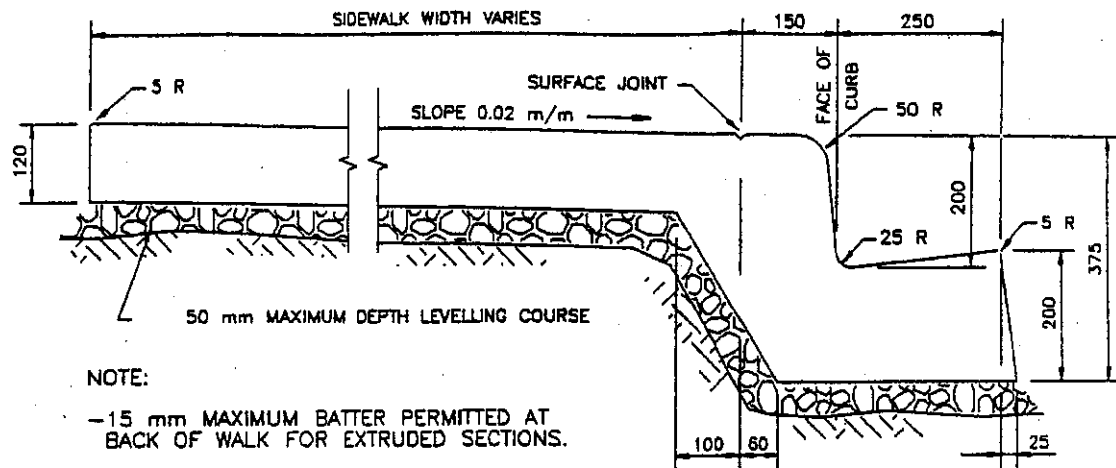
**SECTION AT CROSSING**

ALL DIMENSIONS  
IN MILLIMETRES UNLESS  
OTHERWISE NOTED

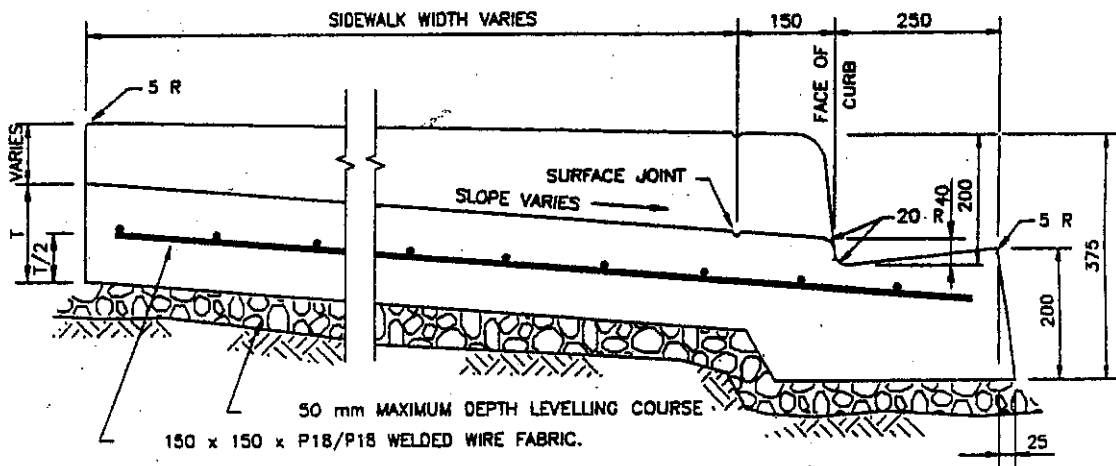
PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-114

TOWN OF TABER  
STANDARD DETAILS

SIDEWALK CROSS SECTIONS



### TYPICAL SECTION



### SECTION AT CROSSING

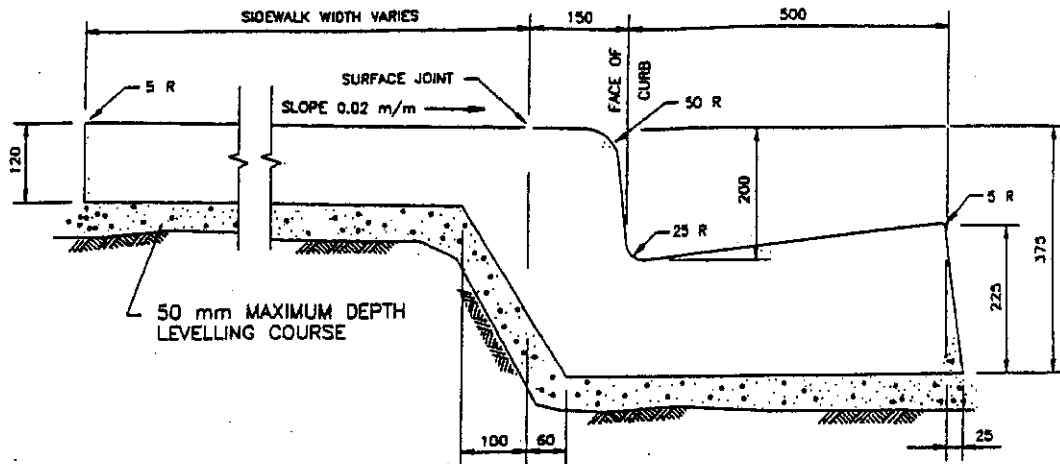
PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-115

TOWN OF TABER

STANDARD DETAILS

MONOLITHIC SIDEWALK

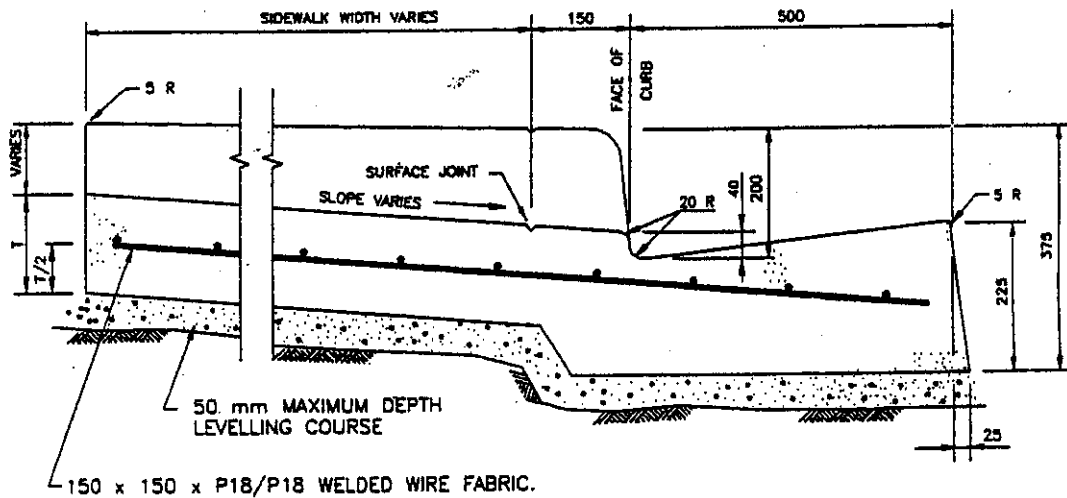
200 mm CURB AND 250 mm GUTTER



NOTE:

- 15 mm MAXIMUM BATTER PERMITTED AT BACK OF WALK FOR EXTRUDED SECTIONS.

TYPICAL SECTION



NOTES:

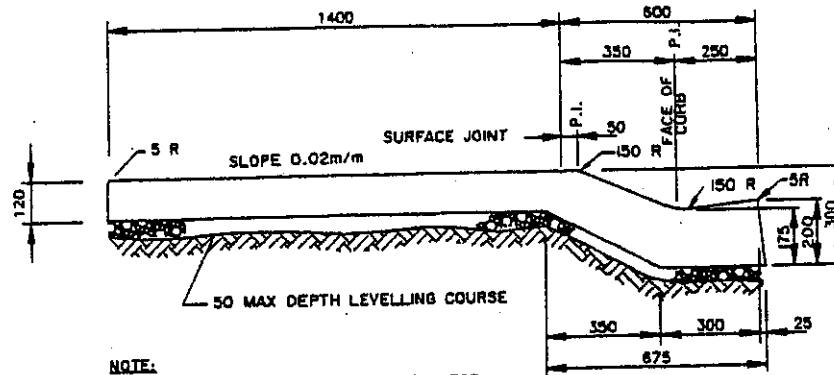
- THICKNESS "T" = 150 mm FOR PRIVATE CROSSINGS.
- THICKNESS "T" = 180 mm FOR LANE AND COMMERCIAL CROSSINGS.
- 0.08 m/m MAXIMUM CROSS SLOPE FOR PRIVATE CROSSINGS.
- 0.04 m/m MAXIMUM CROSS SLOPE FOR LANE AND COMMERCIAL CROSSINGS.
- DEPRESSION AT BACK OF WALK VARIES DEPENDING ON SIDEWALK WIDTH AND TYPE OF CROSSING.

SECTION AT CROSSING

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-116

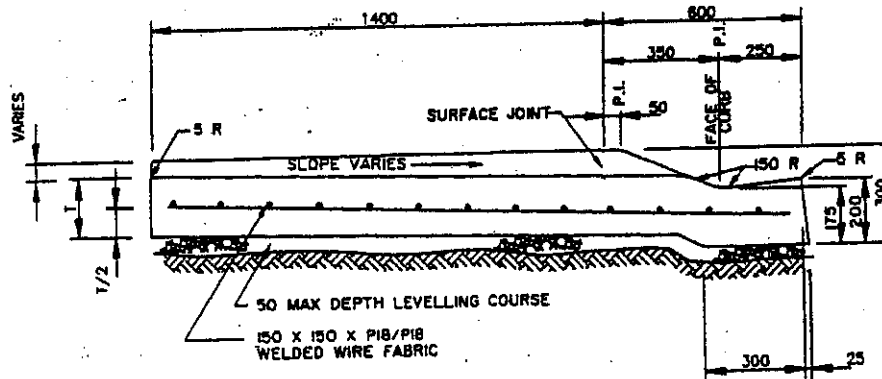
TOWN OF TABER  
STANDARD DETAILS

MONOLITHIC SIDEWALK WITH  
200 mm CURB AND 500 mm GUTTER



NOTE:  
IS MAXIMUM BATTER AT BACK OF WALK FOR  
EXTRUDING SECTIONS.

### TYPICAL SECTION



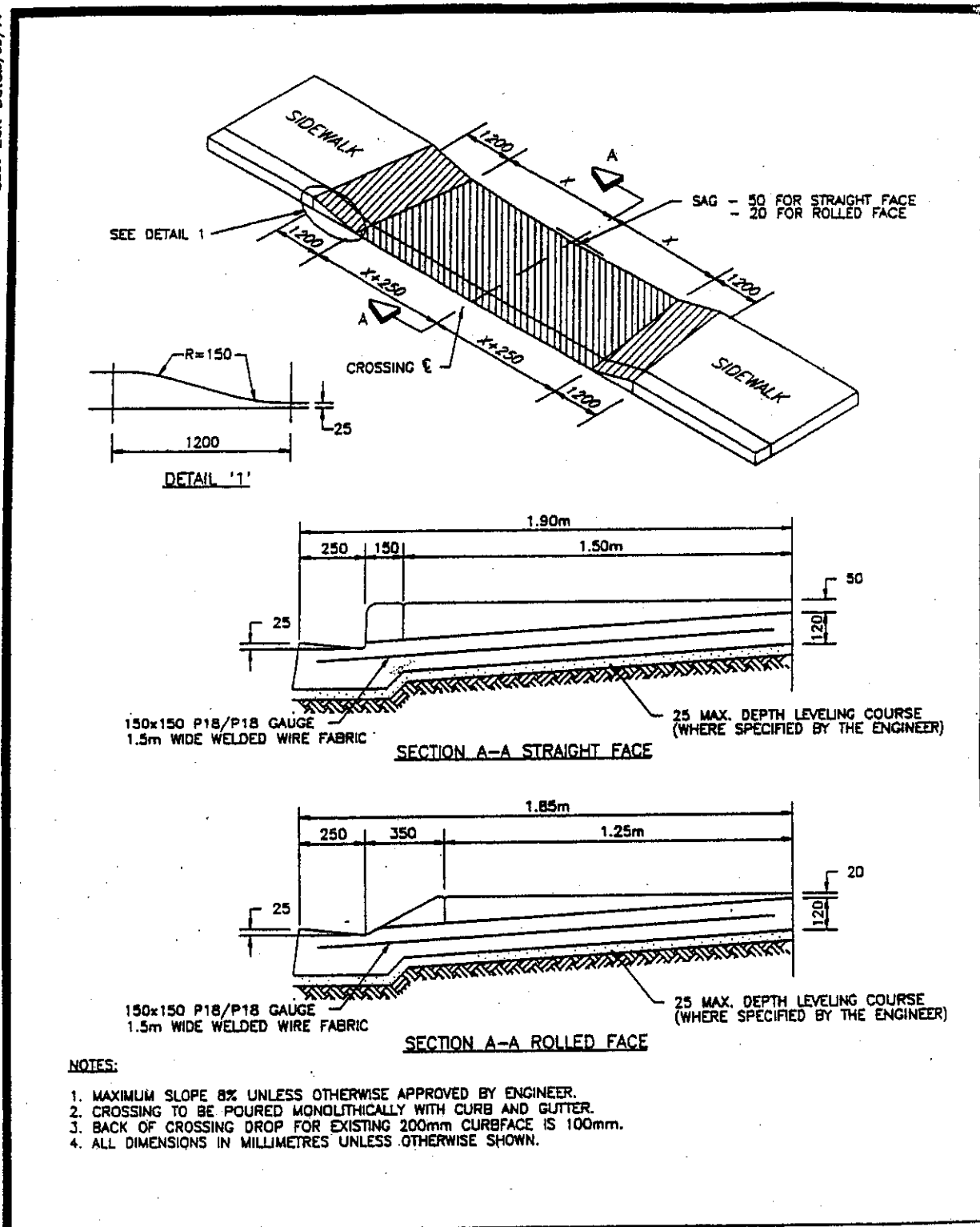
NOTES:

- THICKNESS 'T' = 150 FOR PRIVATE CROSSINGS.
- THICKNESS 'T' = 180 FOR LANE AND COMMERCIAL CROSSINGS.
- 0.08 m/m MAXIMUM CROSS SLOPE FOR PRIVATE CROSSINGS.
- 0.04 m/m MAXIMUM CROSS SLOPE FOR LANE AND COMMERCIAL CROSSINGS.
- DEPRESSION AT BACK OF WALK VARIES DEPENDING UPON  
SIDEWALK WIDTH AND TYPE OF CROSSING.
- ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

PROJECT NO. \_\_\_\_\_  
DATE MAY, 1993  
APPROVED R.M.  
SCALE N.T.S.  
DWG. No. R-117

TOWN OF TABER  
STANDARD DETAILS

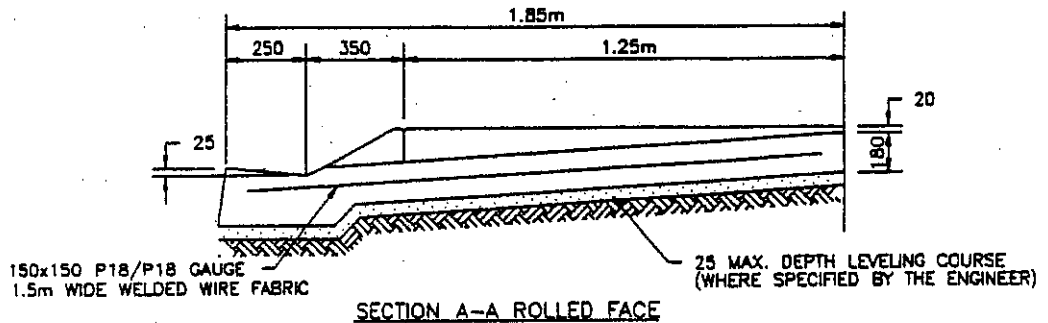
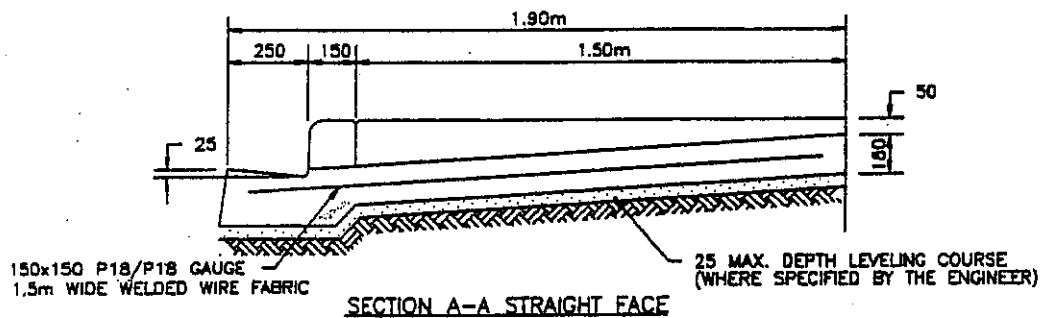
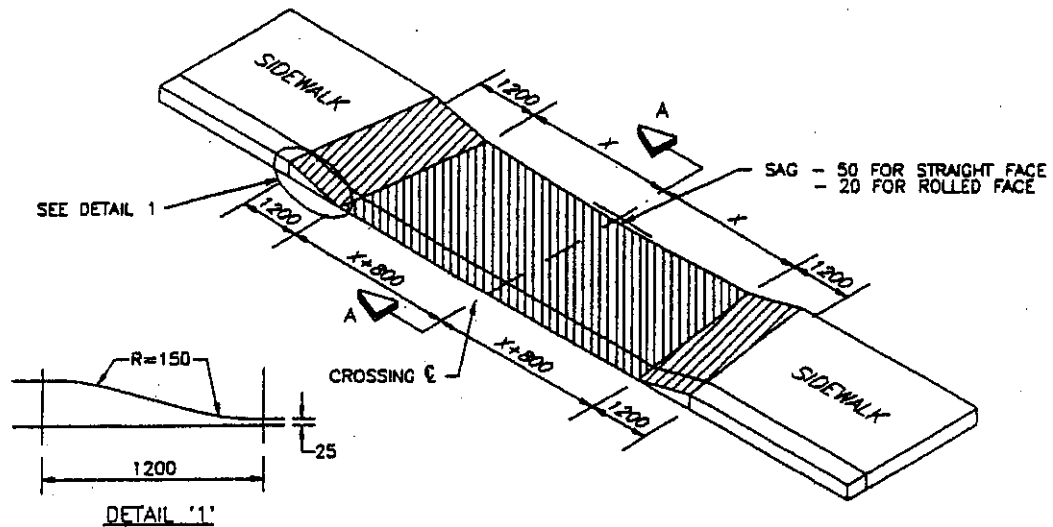
ROLL FACE MONOLITHIC SIDEWALK  
CURB AND GUTTER



PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-118

TOWN OF TABER  
STANDARD DETAILS

LANE CROSSING - PRIVATE



**NOTES:**

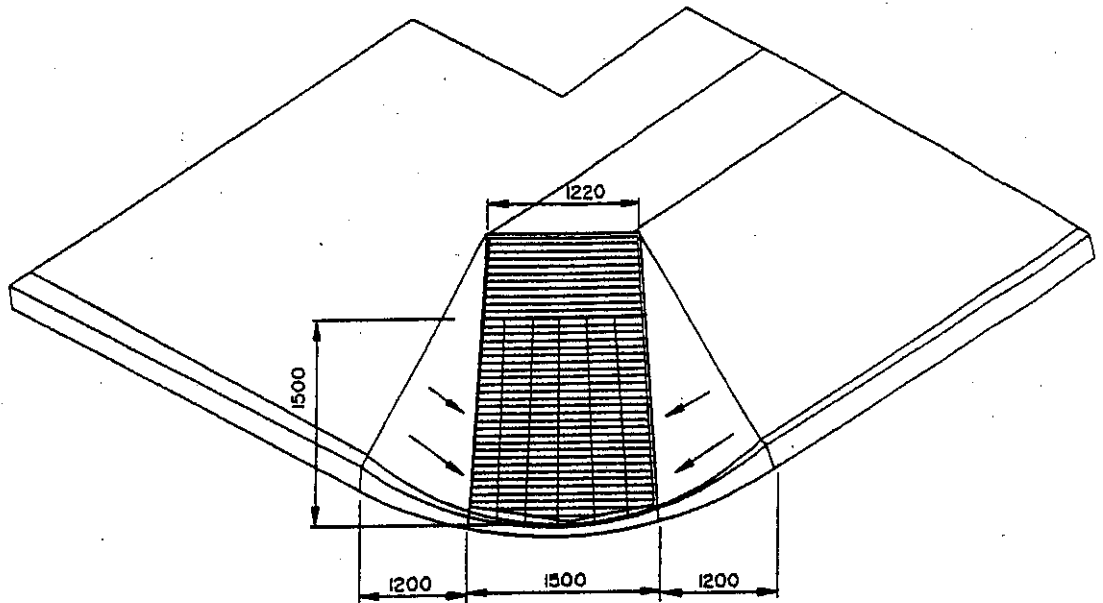
1. MAXIMUM SLOPE 8% UNLESS OTHERWISE APPROVED BY ENGINEER.
2. CROSSING TO BE POURED MONOLITHICALLY WITH CURB AND GUTTER.
3. BACK OF CROSSING DROP FOR EXISTING 200mm CURBFACE IS 100mm.
4. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-119

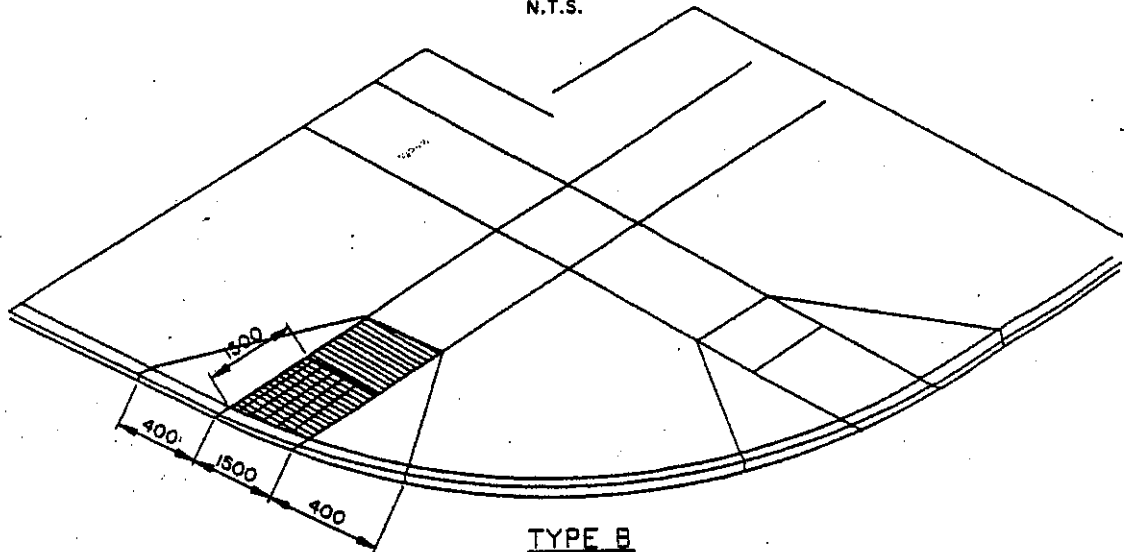
TOWN OF TABER  
STANDARD DETAILS

LANE CROSSING - COMMERCIAL

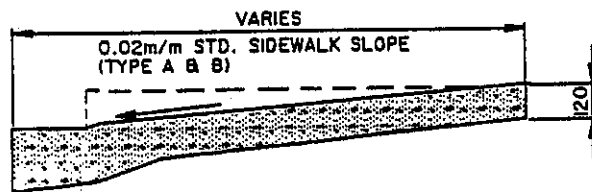
AutoCAD File : R-120.DWG  
 Last Edit Date: 93/05/14



TYPE A  
 N.T.S.



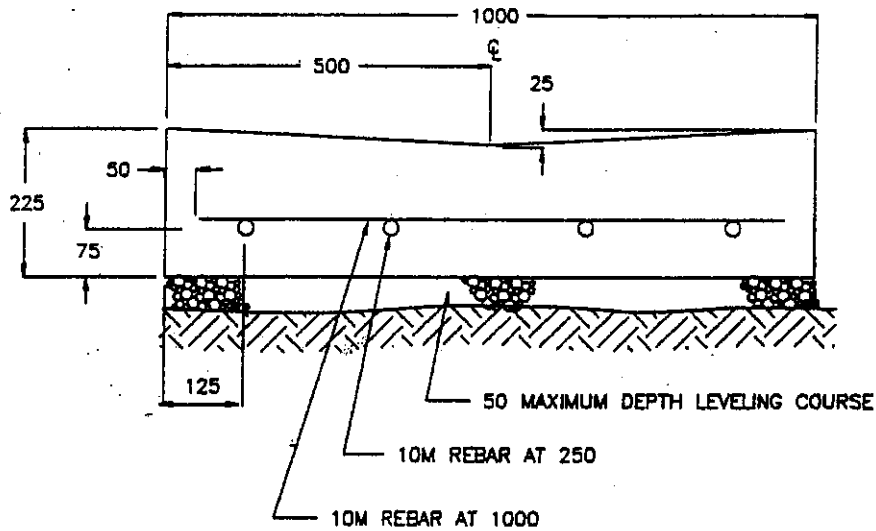
TYPE B  
 N.T.S.



TYPICAL CROSS SECTION A-A  
 N.T.S.

PROJECT NO. \_\_\_\_\_  
 DATE MAY, 1993  
 APPROVED R.M.  
 SCALE N.T.S.  
 DWG. No. R-120

TOWN OF TABER  
 STANDARD DETAILS  
 WHEELCHAIR RAMP  
 TYPE 'A' AND TYPE 'B'



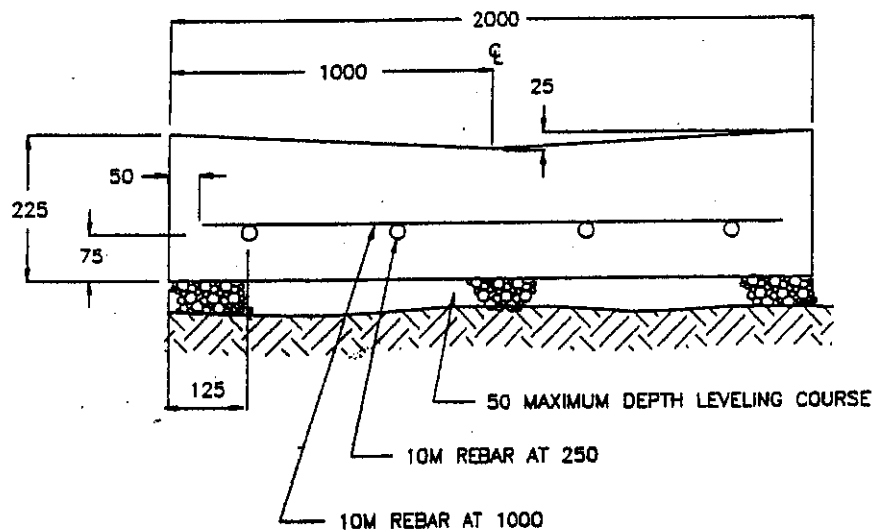
**NOTES:**

- $\phi$  SWALE TO MATCH GUTTER ELEVATION AT UPSTREAM END. LOWER GUTTER LIP TO MEET SWALE EDGE.
- SWALE EDGE TO MATCH GUTTER ELEVATION IN DOWNSTREAM END. LOWER GUTTER LIP TO MATCH  $\phi$  OF SWALE.
- EXPANSION JOINTS TO BE CONSTRUCTED AT ENDS OF SWALE WHERE SWALE ABUTS GUTTERS.
- CONTRACTION JOINTS 50 DEEP AND 5 WIDE TO BE CONSTRUCTED 3m ON CENTERS ALONG SWALE.
- CROWN OF ROAD TO BE TAPERED, STARTING 15m FROM SWALE, TO PROVIDE SMOOTH VEHICULAR CROSSING OF SWALE.
- ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-121

TOWN OF TABER  
STANDARD DETAILS

SWALE GUTTER - 1.0m



**NOTES:**

- G SWALE TO MATCH GUTTER ELEVATION AT UPSTREAM END. LOWER GUTTER LIP TO MEET SWALE EDGE.
- SWALE EDGE TO MATCH GUTTER ELEVATION IN DOWNSTREAM END. LOWER GUTTER LIP TO MATCH G OF SWALE.
- EXPANSION JOINTS TO BE CONSTRUCTED AT ENDS OF SWALE WHERE SWALE ABUTS GUTTERS.
- CONTRACTION JOINTS 50 DEEP AND 5 WIDE TO BE CONSTRUCTED 3m ON CENTERS ALONG SWALE.
- CROWN OF ROAD TO BE TAPERED, STARTING 15m FROM SWALE, TO PROVIDE SMOOTH VEHICULAR CROSSING OF SWALE.
- ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

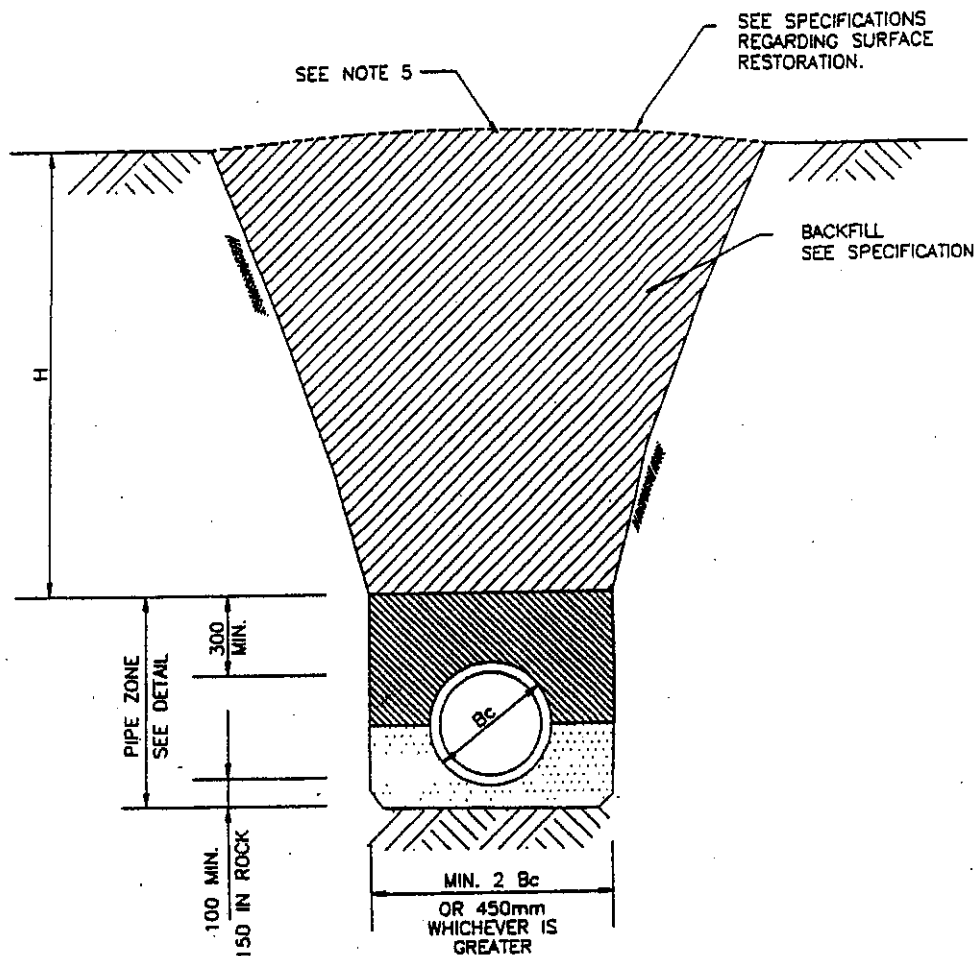
PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ R-122

TOWN OF TABER  
STANDARD DETAILS

SWALE GUTTER - 2.0m

**DIVISION 2**

**TRENCH DETAILS**

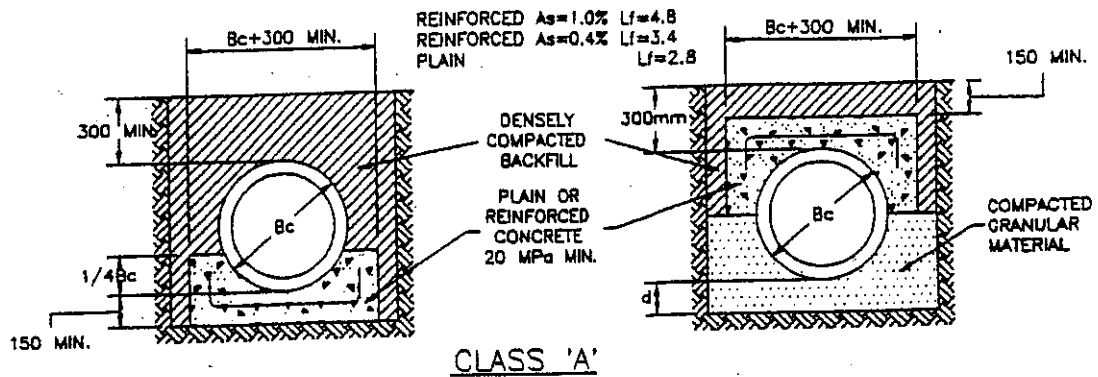


NOTES:

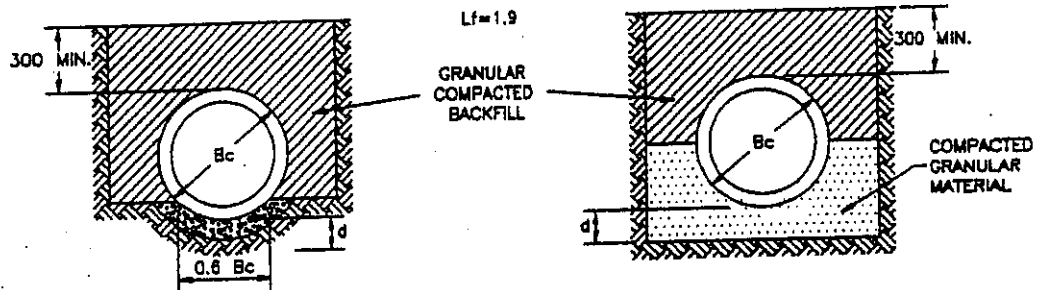
1. WHEN CUT BACK SLOPES ARE TO BE USED IN LIEU OF CAGES AND SHORING, THESE SLOPES ARE TO MEET REQUIREMENTS OF LOCAL CODES.
2. SEE SPECIFICATIONS FOR MINIMUM COVER ABOVE PIPE.
3. MIN. PIPE ZONE WIDTH IS SPECIFIED TO ALLOW PROPER PIPE ZONE COMPACTION.
4. Bc = OUTSIDE PIPE DIAMETER.
5. FOR UNCOMPACTED BACKFILL, CROWN TRENCH BY  $0.1 \times H$ .

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ T-101

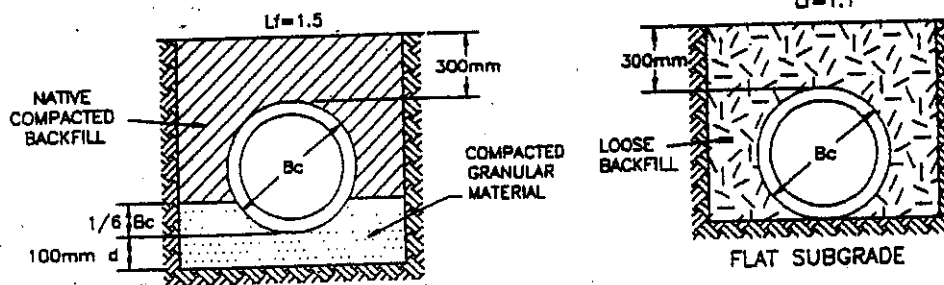
TOWN OF TABER  
STANDARD DETAILS  
TRENCH DETAIL



CLASS 'A'



CLASS 'B'



CLASS 'C'

CLASS 'D'

**LEGEND:**

**LEGEND:**

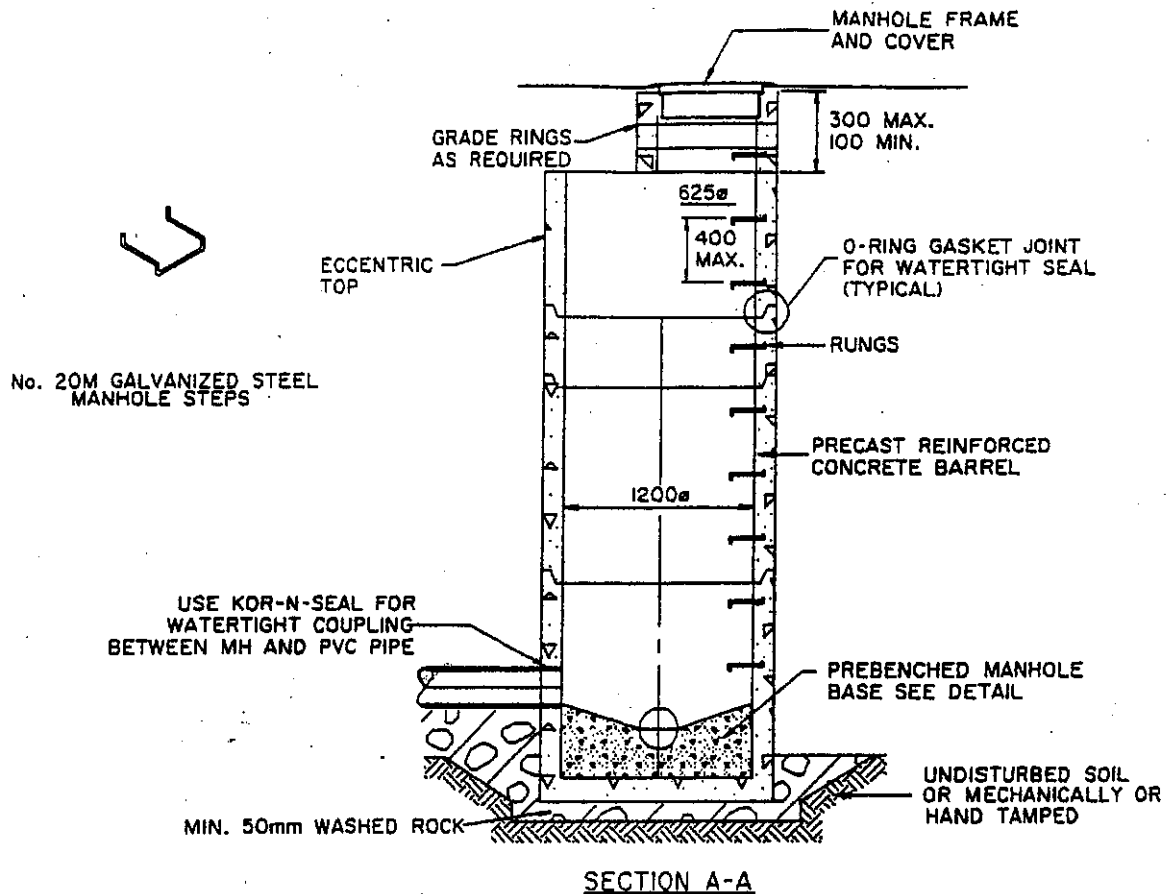
- H = TRENCH DEPTH ABOVE BEDDING ZONE
- Bc = OUTSIDE PIPE DIAMETER
- d = DEPTH OF BEDDING MATERIAL BELOW PIPE (100mm MIN.,  
150mm IN ROCK)
- As = AREA OF TRANSVERSE STEEL IN THE CRADLE OR ARCH  
EXPRESSED AS A PERCENTAGE OF AREA OF CONCRETE  
AT INVERT OR CROWN.
- Lf = LOAD FACTOR

PROJECT NO: \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ T-102

TOWN OF TABER  
STANDARD DETAILS  
PIPE ZONE DETAIL

**DIVISION 3**

**SANITARY SEWER  
DETAILS**



**NOTE :**

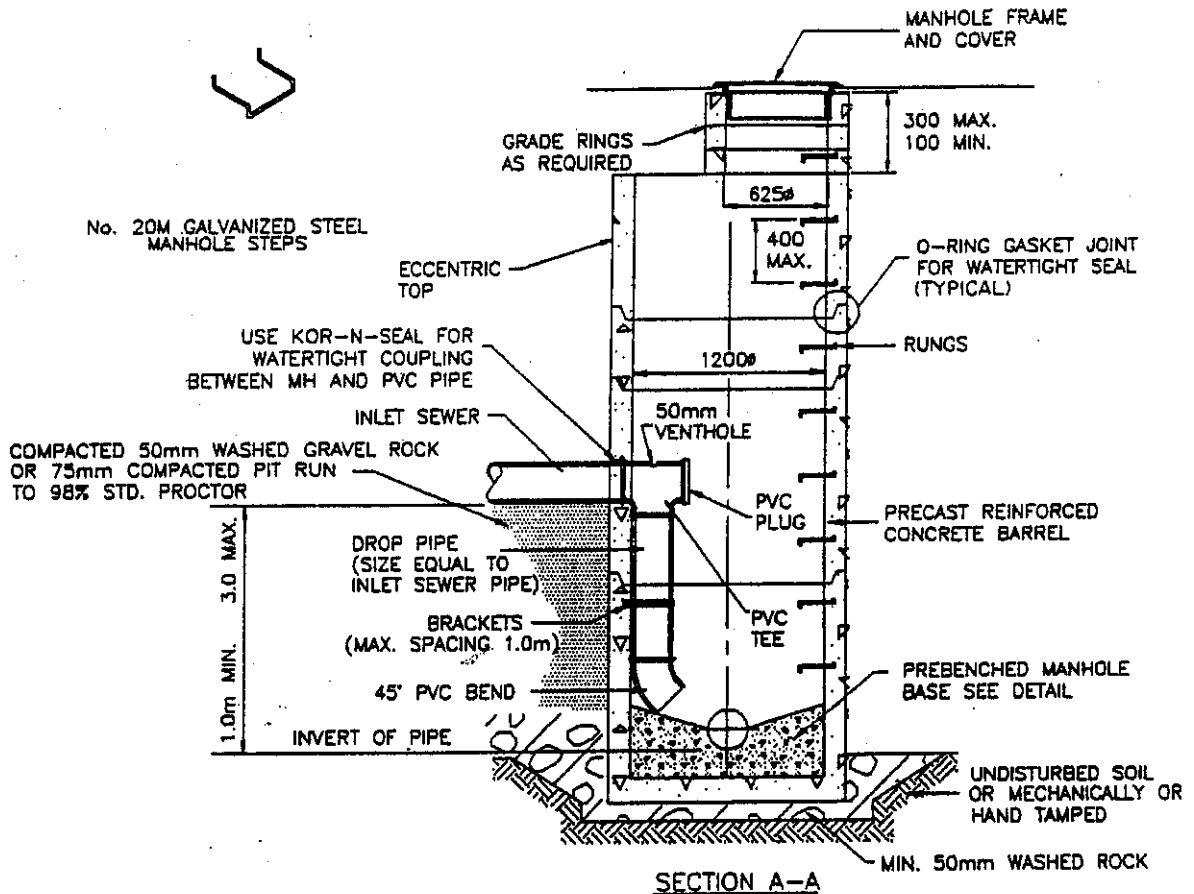
1. PRECAST RINGS, CONES AND BARRELS TO MEET CURRENT A.S.T.M. C478 STANDARDS.
2. SPECIAL BASE DESIGN REQUIRED FOR DEPTHS OVER 9.0m.
3. CHANNELLING AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS. CONTINUE MAIN PIPE WHERE POSSIBLE.
4. CONICAL TOP TO BE USED WHERE DISTANCE FROM BENCH TO MH COVER EXCEEDS 2m.
5. VERTICAL SIDE OF CONICAL MH ON UPSTREAM SIDE.
6. INSTALL SAFETY PLATFORMS FOR ALL MH OVER 5m DEEP, LOCATED 2m ABOVE PIPE.

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ S-101

TOWN OF TABER

STANDARD DETAILS

PRECAST MANHOLE



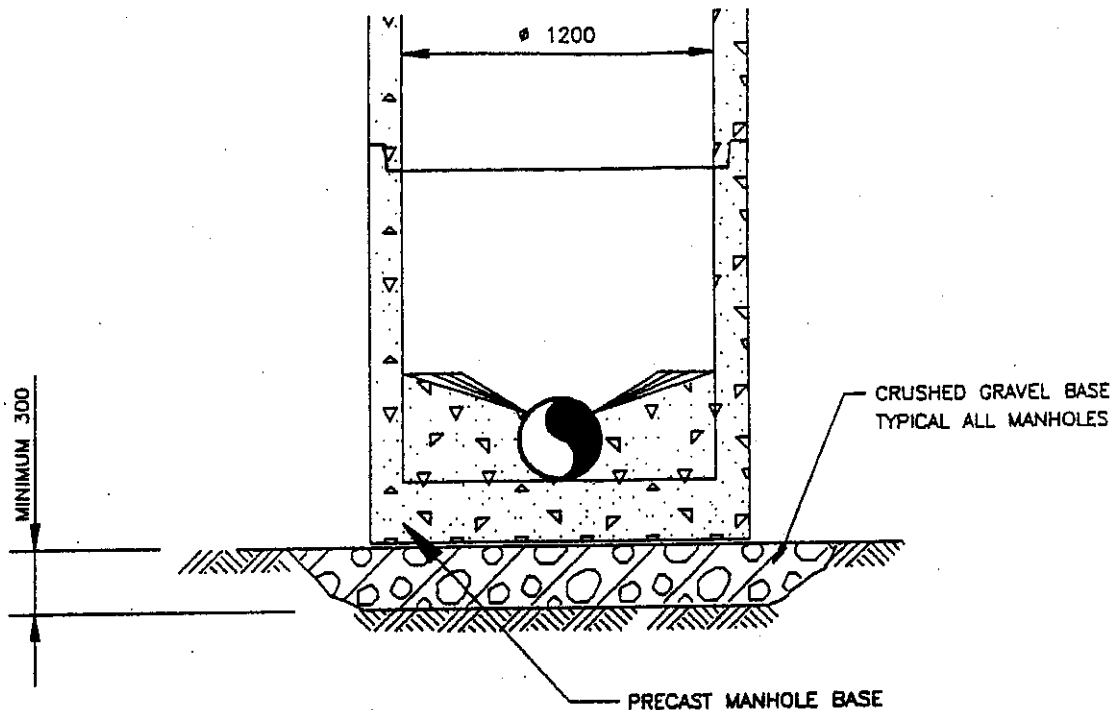
**NOTE :**

1. PRECAST RINGS, CONES AND BARRELS TO MEET CURRENT A.S.T.M. C478 STANDARDS.
2. SPECIAL BASE DESIGN REQUIRED FOR DEPTHS OVER 9.0m.
3. CHANNELLING AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS. CONTINUE MAIN PIPE WHERE POSSIBLE.
4. CONICAL TOP TO BE USED WHERE DISTANCE FROM BENCH TO MH COVER EXCEEDS 2m.
5. VERTICAL SIDE OF CONICAL MH ON UPSTREAM SIDE.
6. INSTALL SAFETY PLATFORMS FOR ALL MH OVER 5m DEEP, LOCATED 2m ABOVE PIPE.

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ 5-102

TOWN OF TABER  
STANDARD DETAILS

DROP MANHOLE



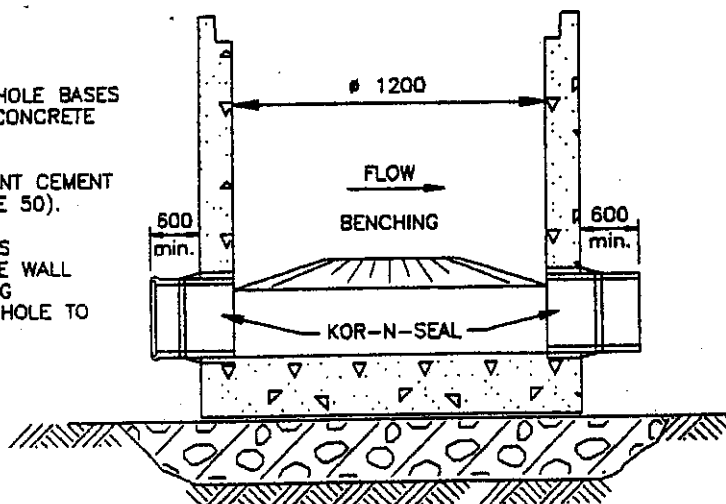
STANDARD MANHOLE  
SECTIONS ABOVE

**NOTE**

PREBENCHED MANHOLE BASES  
AS SUPPLIED BY CONCRETE  
MANUFACTURER.

SULPHATE RESISTANT CEMENT  
TO BE USED (TYPE 50).

PIPE PENETRATIONS  
THROUGH MANHOLE WALL  
TO BE MADE USING  
KOR-N-SEAL MANHOLE TO  
PIPE SEALS.

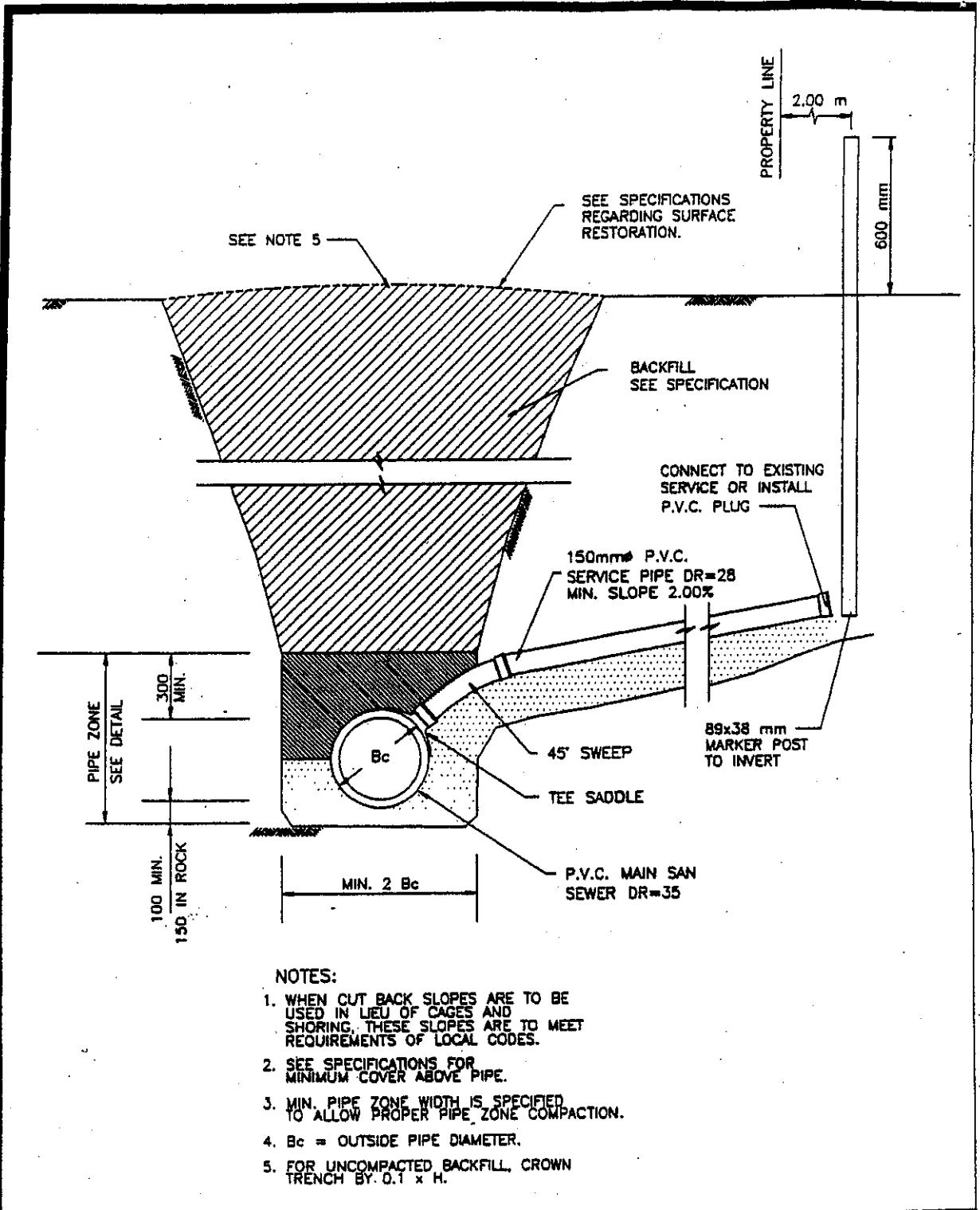


FOR P.V.C. PIPE

PROJECT NO.	
DATE	MAY, 1993
APPROVED	R.M.
SCALE	N.T.S.
DWG. No.	S-103

TOWN OF TABER  
STANDARD DETAILS

PREBENCHED MANHOLE BASES

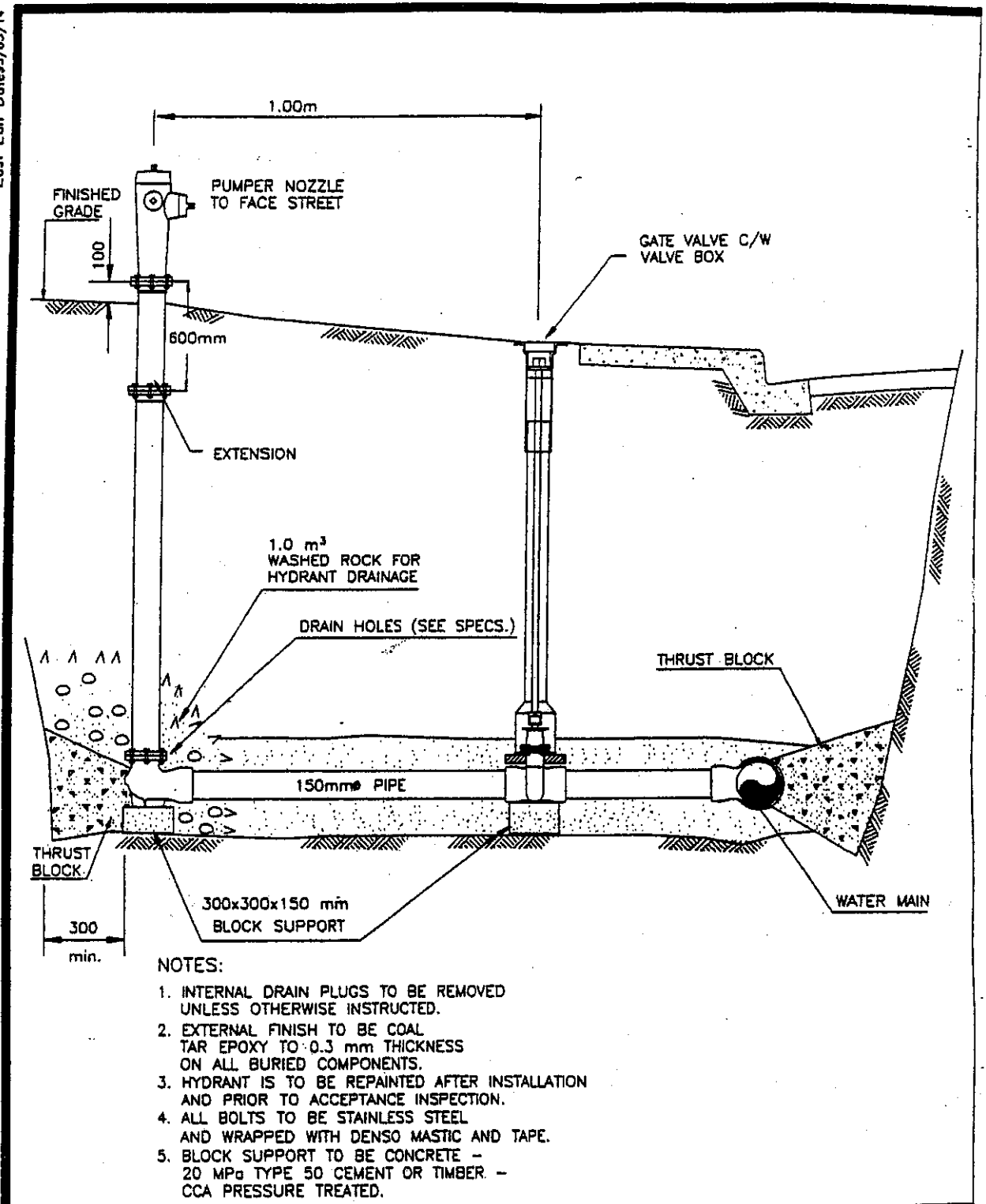


PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ 5-104

TOWN OF TABER  
STANDARD DETAILS  
SANITARY SEWER  
SERVICE CONNECTION

**DIVISION 4**

**WATER DETAILS**



PROJECT NO. \_\_\_\_\_

DATE \_\_\_\_\_ MAY, 1993

APPROVED \_\_\_\_\_ R.M.

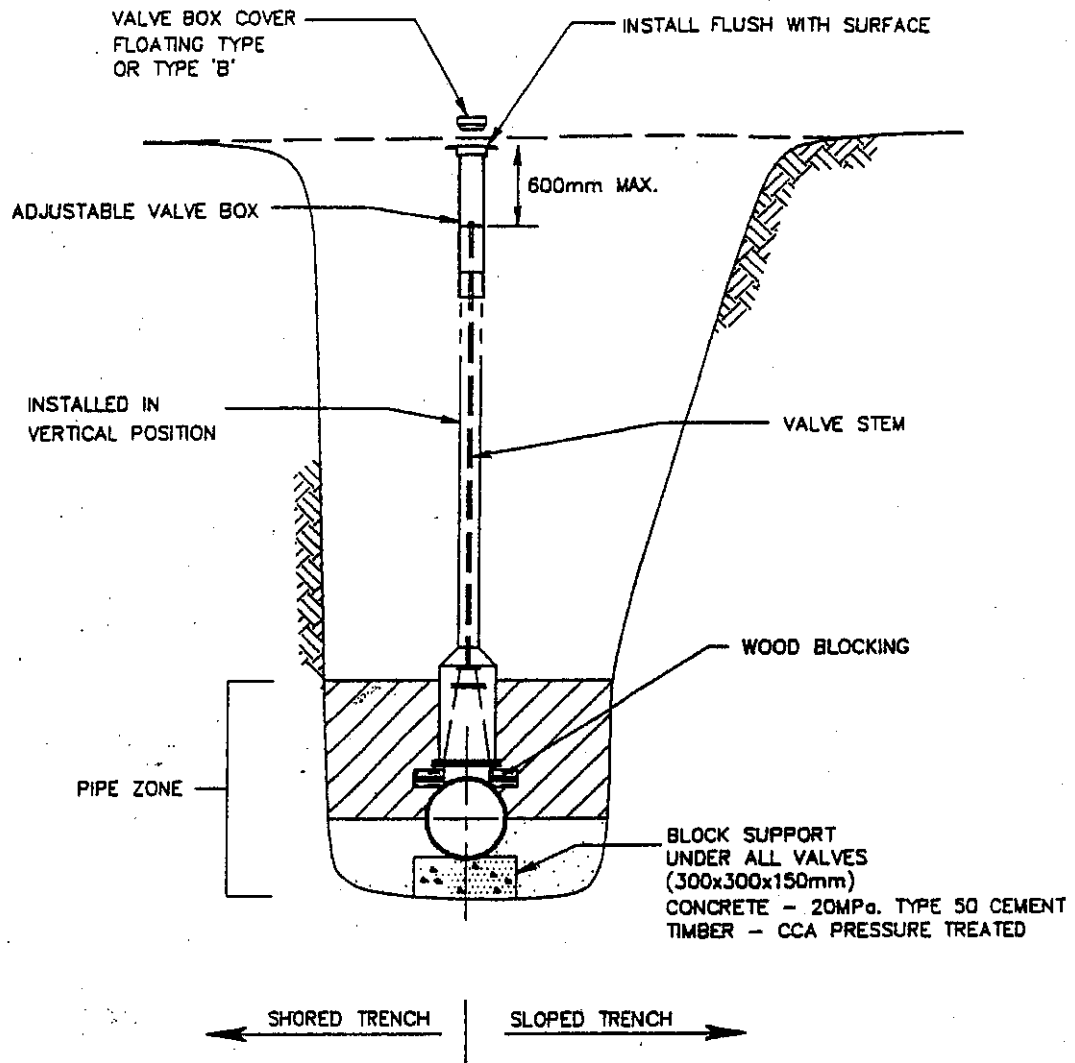
SCALE \_\_\_\_\_ N.T.S.

DWG. No. \_\_\_\_\_ W-101

TOWN OF TABER

STANDARD DETAILS

HYDRANT CONNECTION DETAIL



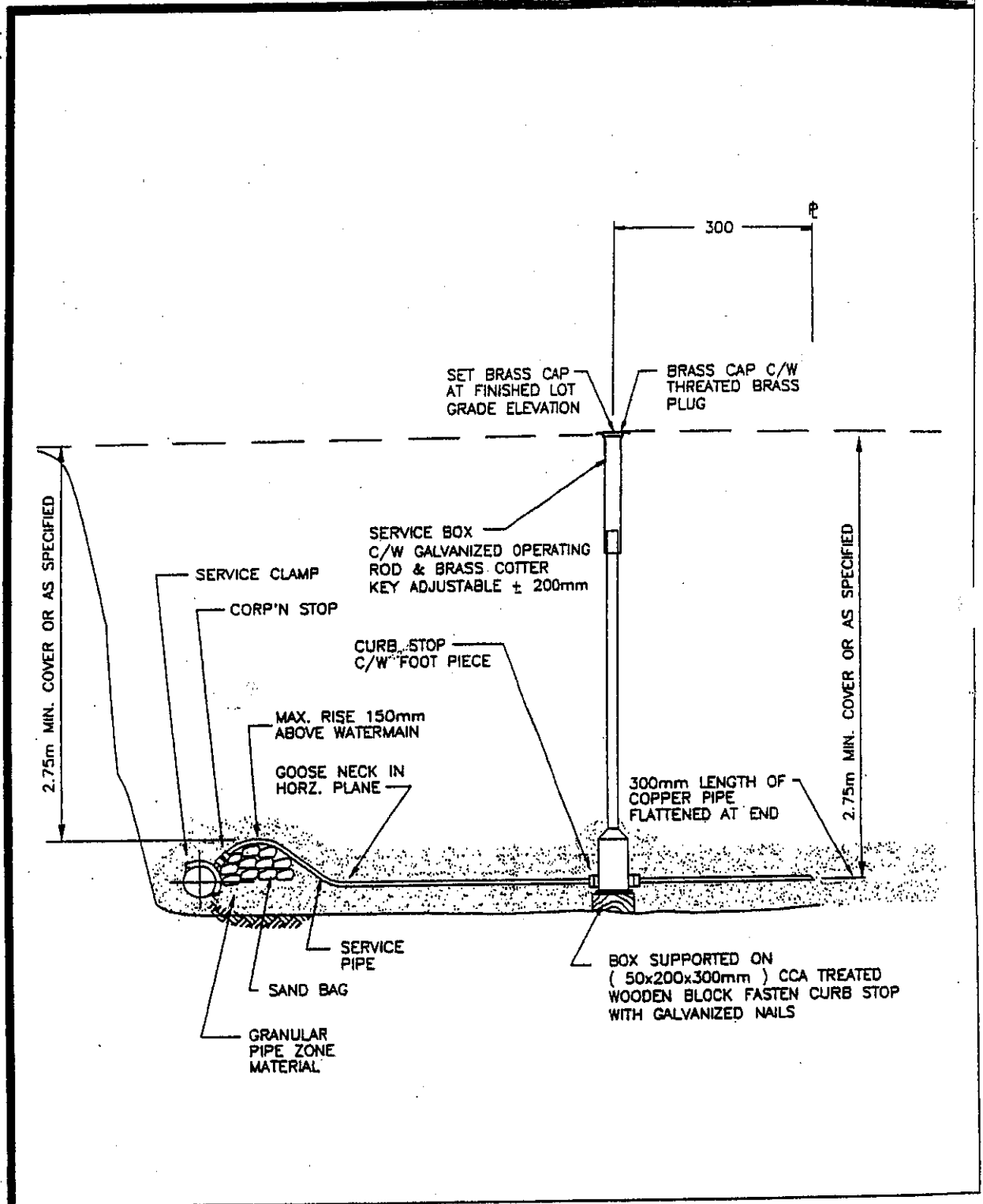
**NOTES:**

1. FOR VALVES LESS THAN 400mm USE  
FLOATING TYPE OR TYPE 'B' VALVE BOX. (NORWOOD FOUNDRY)
2. ALL BOLTS TO BE STAINLESS STEEL  
WRAPPED WITH DENSO MASTIC AND DENSO TAPE.

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ W-102

TOWN OF TABER  
STANDARD DETAILS

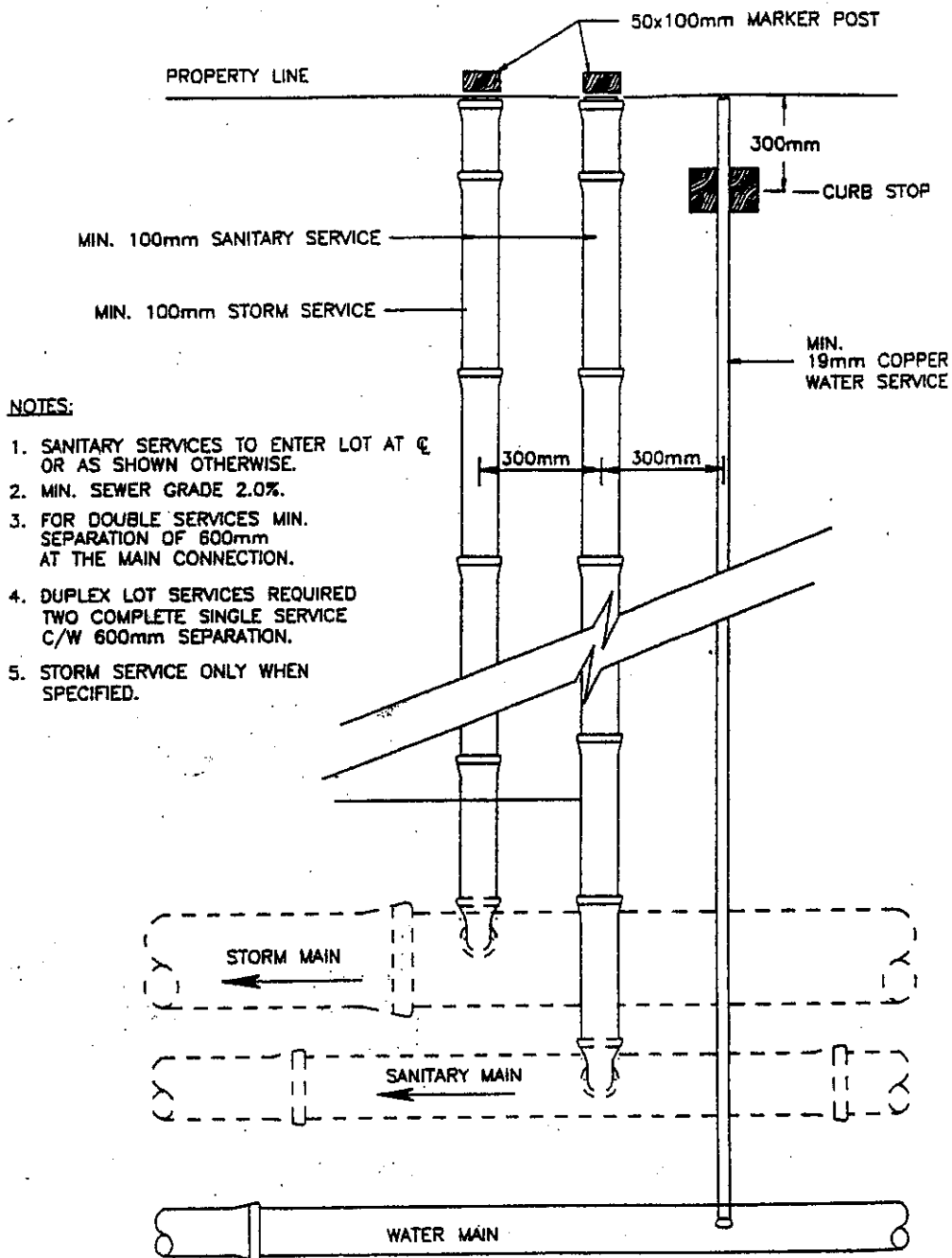
VALVE INSTALLATION DETAIL



PROJECT NO. \_\_\_\_\_  
 DATE \_\_\_\_\_ MAY, 1993  
 APPROVED \_\_\_\_\_ R.M.  
 SCALE \_\_\_\_\_ N.T.S.  
 DWG. No. \_\_\_\_\_ W-103

TOWN OF TABER  
 STANDARD DETAILS

TYPICAL WATER SERVICE CONNECTION



**NOTES:**

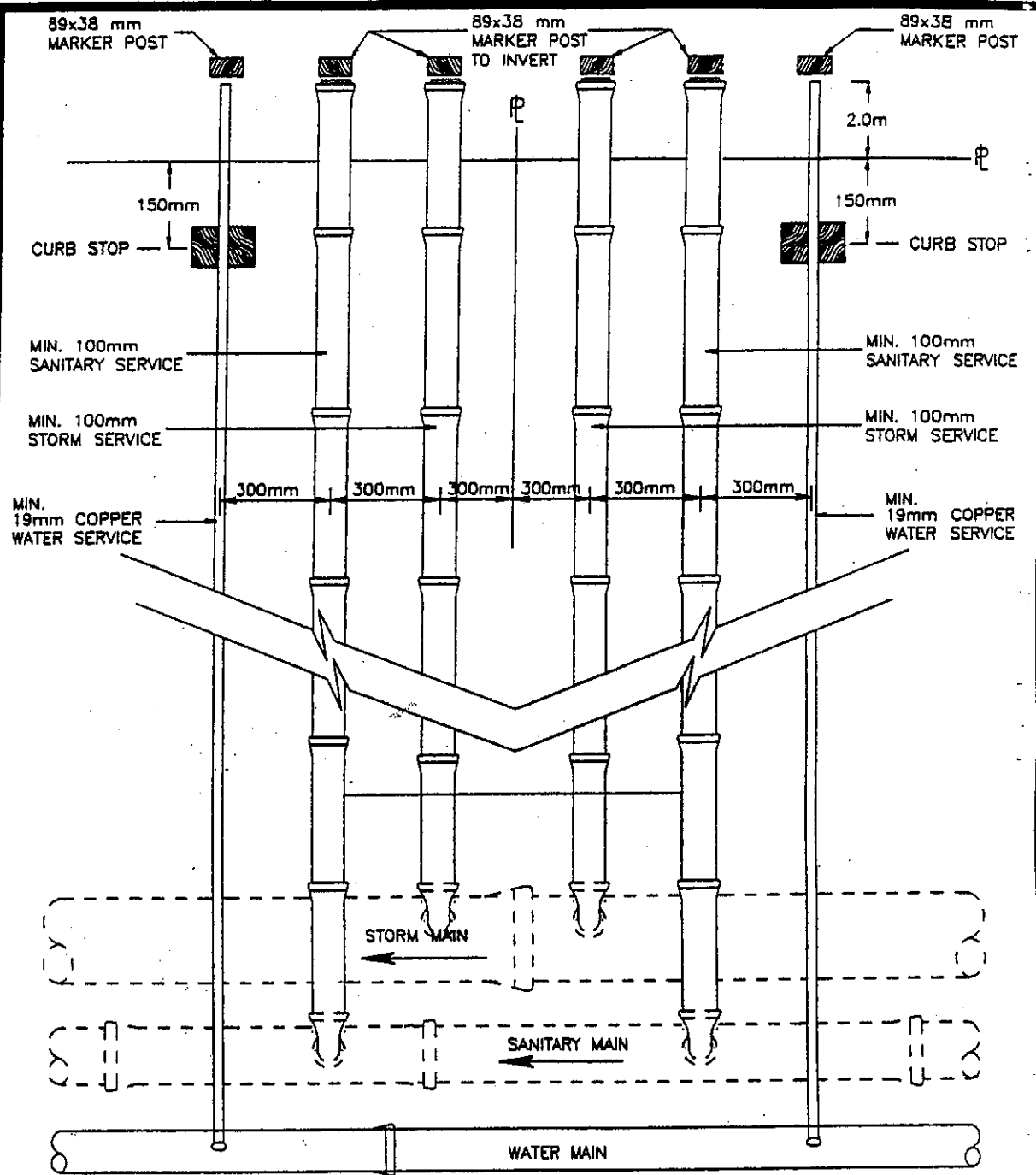
1. SANITARY SERVICES TO ENTER LOT AT C OR AS SHOWN OTHERWISE.
2. MIN. SEWER GRADE 2.0%.
3. FOR DOUBLE SERVICES MIN. SEPARATION OF 600mm AT THE MAIN CONNECTION.
4. DUPLEX LOT SERVICES REQUIRED TWO COMPLETE SINGLE SERVICE C/W 600mm SEPARATION.
5. STORM SERVICE ONLY WHEN SPECIFIED.

PROJECT NO. \_\_\_\_\_  
DATE MAY, 1993  
APPROVED R.M.  
SCALE N.T.S.  
DWG. No. W-104

TOWN OF TABER  
STANDARD DETAILS

SINGLE SERVICE CONNECTION DETAIL

AutoCAD File W-105.DWG  
Last Edit Date 93/05/14



**NOTES:**

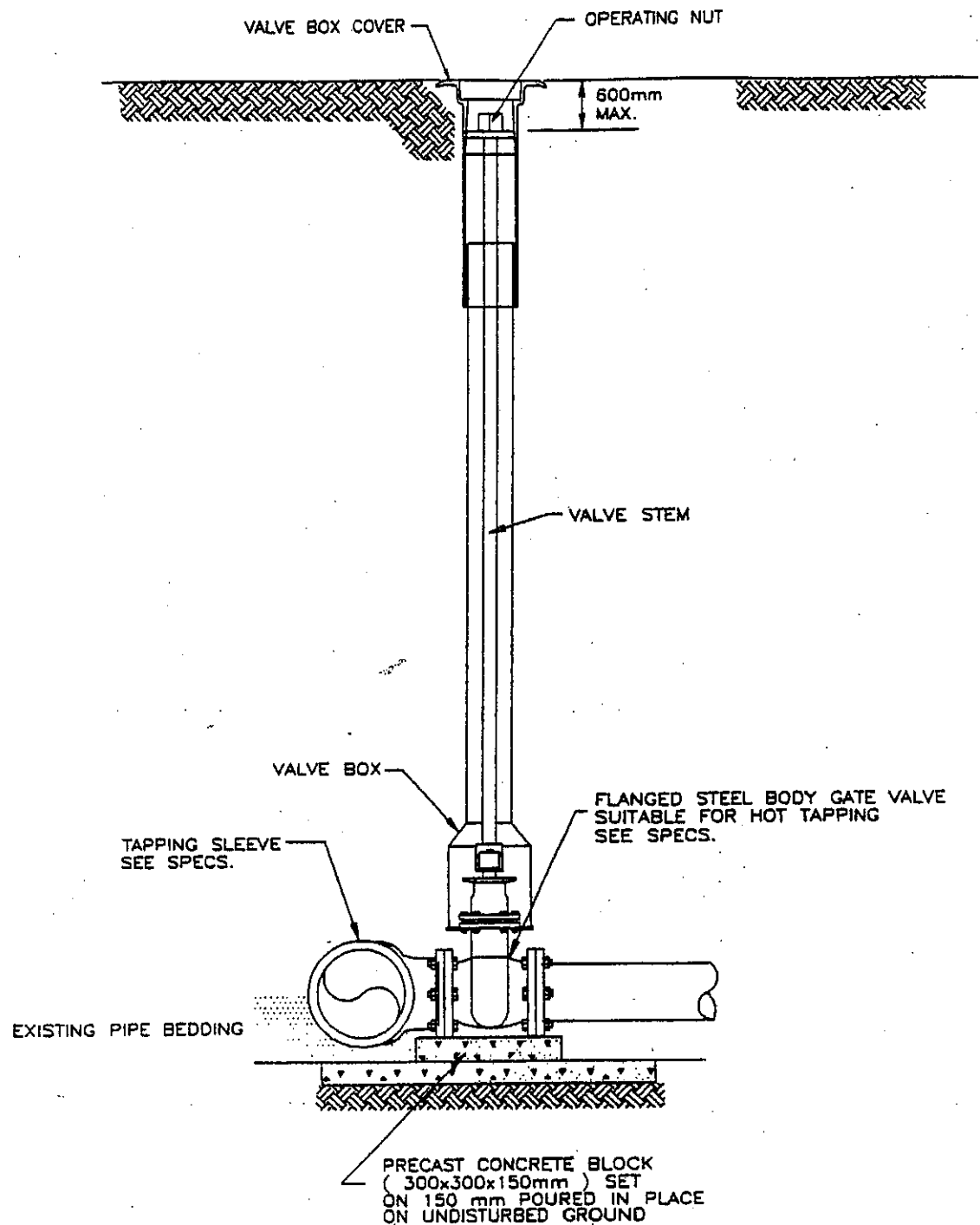
1. SANITARY SERVICES TO ENTER LOT AT C OR AS SHOWN OTHERWISE.
2. MIN. SEWER GRADE 2.0%.
3. STORM SERVICE ONLY WHEN SPECIFIED.

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ W-105

TOWN OF TABER  
STANDARD DETAILS

DUAL SERVICE CONNECTION DETAIL

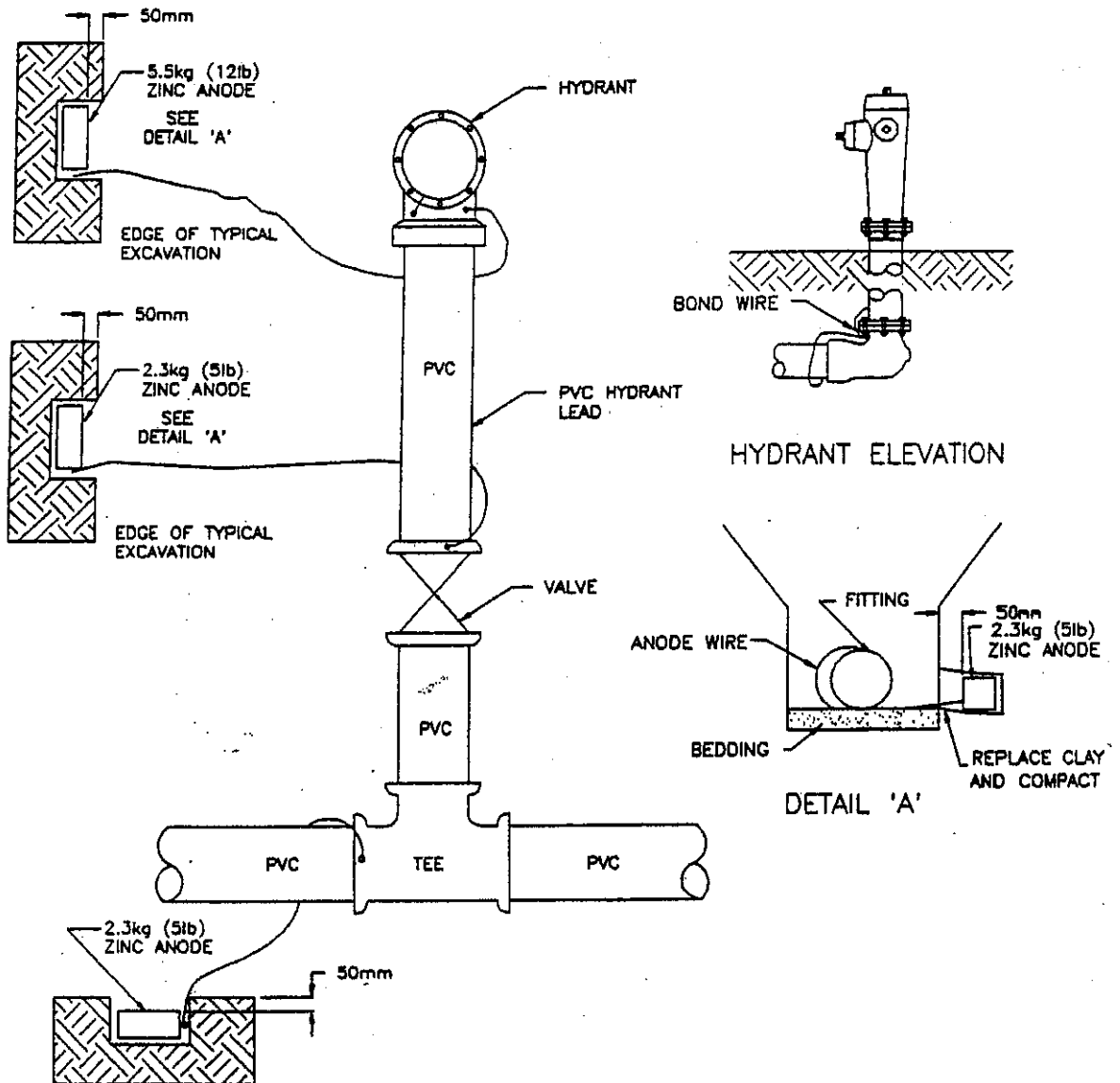
AutoCAD File : W-106.DWG  
Last Edit Date: 93/05/14



PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ W-106

TOWN OF TABER  
STANDARD DETAILS

HOT TAPPING CONNECTION



NOTES:

1. MINIMUM DISTANCE FROM ANODE TO PIPE, FITTING, VALVE, OR HYDRANT IS 150mm.
2. INSTALL ANODE AT APPROX. PIPE DEPTH IN NATIVE SOIL.
3. ZINC ANODES TO BE EMBEDDED INTO TRENCH WALL TO PROVIDE FOR A MINIMUM OF 50mm OF NATIVE CLAY COMPLETELY SURROUNDING THE ANODE.
4. ANODES TO BE AT LEAST 300mm CLEAR OF THRUST BLOCK.

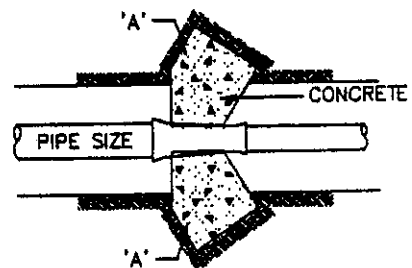
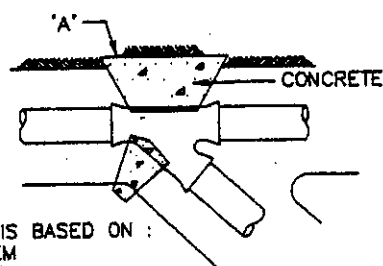
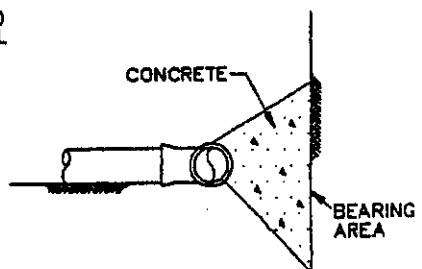
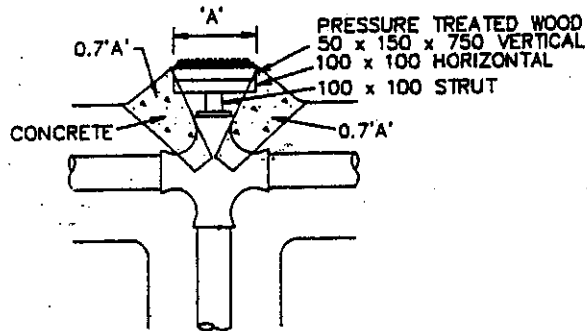
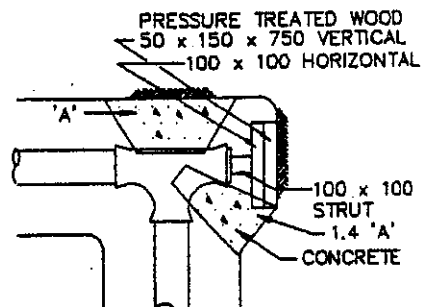
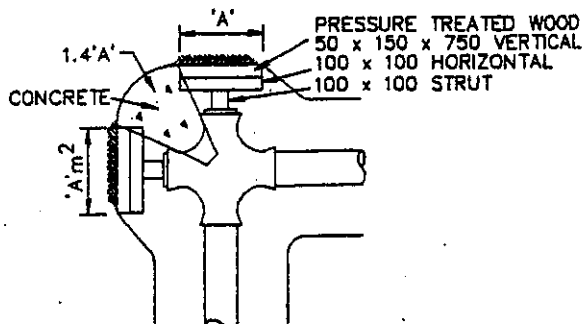
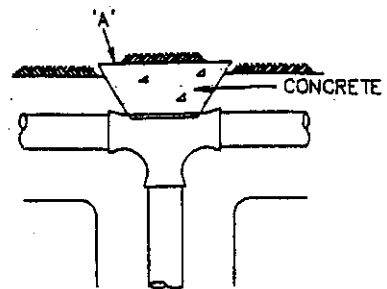
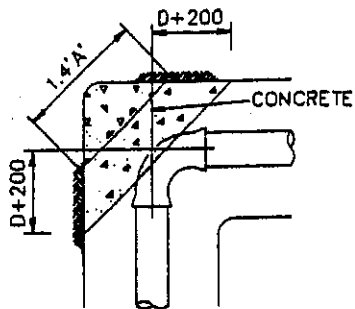
PROJECT NO. \_\_\_\_\_  
DATE MAY, 1993  
APPROVED R.M.  
SCALE N.T.S.  
DWG. No. W-107

TOWN OF TABER  
STANDARD DETAILS

HYDRANT ANODE DETAIL

**BEND DEFLECTION**

90°	1.4A
45°	0.7A
22 1/2°	0.35A
11 1/4°	0.18A



THRUST BLOCK DESIGN IS BASED ON :

1. 1050kPa MAX. SYSTEM PRESSURE OR 700kPa OPERATING PRESSURE PLUS A SURGE ALLOWANCE OF 345kPa (2fps SURGE ALLOWANCE AT 25psi/fps)
2. THRUST BLOCK DESIGN ASSUMES A MIN. VERTICAL SOIL BEARING OF 100kPa
3. THRUST BLOCK BEARING AREA BASED ON P.V.C. PIPE (AWWA C900 AND C905 DR18)
4. CONCRETE 20MPa TYPE 50 CEMENT.

TABLE - FOR CALCULATION OF BASIC THRUST BLOCK BEARING AREA 'A' (IN SQUARE METRES)

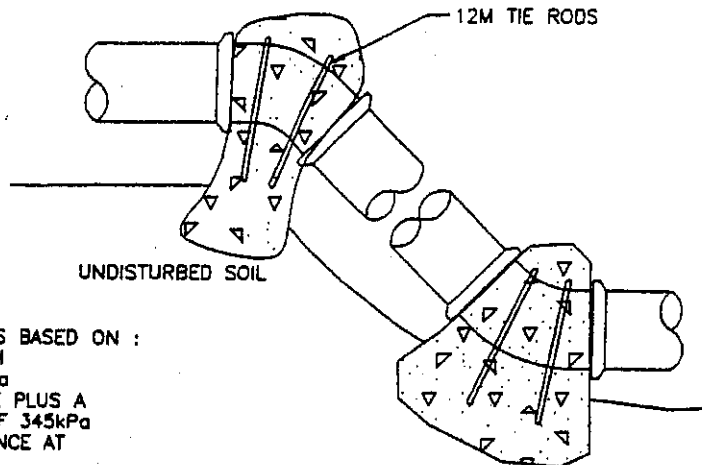
PIPE SIZE	150	200	250	300	350	400	450
'A'	0.40	0.68	1.06	1.54	2.08	2.72	3.44

PROJECT NO. \_\_\_\_\_  
DATE MAY, 1993  
APPROVED R.M.  
SCALE N.T.S.  
DWG. No. W-108

TOWN OF TABER

STANDARD DETAILS

HORIZONTAL THRUST BLOCK DETAIL



THRUST BLOCK DESIGN IS BASED ON :

1. 1050kPa MAX. SYSTEM PRESSURE OR 700kPa OPERATING PRESSURE PLUS A SURGE ALLOWANCE OF 345kPa (2fps SURGE ALLOWANCE AT 25psi/fps)
2. THRUST BLOCK DESIGN ASSUMES A MIN. VERTICAL SOIL BEARING OF 100kPa
3. THRUST BLOCK BEARING AREA BASED ON P.V.C. PIPE (AWWA C900 AND C905 DR18)
4. CONCRETE 20MPa TYPE 50 CEMENT.
5. UNIT WEIGHT OF CONCRETE ASSUMED IS 2400kg/m<sup>3</sup>

### VERTICAL BEND

### UPWARD THRUST (GRAVITY)

TABLE - FOR CALCULATION OF BASIC THRUST BLOCK BEARING AREA ( IN SQUARE METRES )  
 CONCRETE UNIT WEIGHT 2400Kg/cu.m

BEND \ PIPE SIZE	150	200	250	300	350	400	450
11.25'	0.16	0.28	0.45	0.64	0.87	1.14	1.44
22.50'	0.32	0.57	0.88	1.27	1.73	2.26	2.82
30'	0.42	0.75	1.17	1.69	2.30	3.00	3.80
45'	0.62	1.11	1.73	2.50	3.40	4.44	5.62

### DOWNWARD THRUST

TABLE - FOR CALCULATION OF BASIC THRUST BLOCK BEARING AREA ( IN SQUARE METRES )  
 CONCRETE UNIT WEIGHT 2400Kg/cu.m

BEND \ PIPE SIZE	150	200	250	300	350	400	450
11.25'	0.04	0.07	0.11	0.15	0.21	0.27	0.34
22.50'	0.08	0.13	0.21	0.30	0.41	0.53	0.67
30'	0.10	0.18	0.28	0.40	0.54	0.71	0.89
45'	0.15	0.26	0.41	0.59	0.80	1.05	1.32

PROJECT NO. \_\_\_\_\_  
 DATE \_\_\_\_\_ MAY, 1993  
 APPROVED \_\_\_\_\_ R.M.  
 SCALE \_\_\_\_\_ N.T.S.  
 DWG. No. \_\_\_\_\_ W-109

TOWN OF TABER  
 STANDARD DETAILS

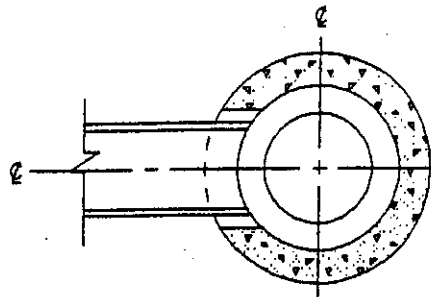
VERTICAL BEND THRUST BLOCK DETAIL

**DIVISION 5**

**STORM SEWER**

**DETAILS**

AutoCAD File : ST-101.DWG  
Last Edit Date: 9/3/95/14



SECTION A-A

100 OR 150 NECK RING TO  
SUIT SUBGRADE.  
FOR HIGH ROLL FACE CURB  
USE 150 OR 100 TAPERED  
NECK RING

C.B. SHOULDER RING

25mm $\phi$  LIFTING HOLE

MORTAR JOINT

250mm $\phi$  CONCRETE PIPE  
SET FLUSH WITH WALL AND  
MORTARED IN POSITION

UNDISTURBED SOIL OR  
TAMPED BACKFILL

BOTTOM OF  
DESIGN SUBGRADE

200

150

2030

375mm $\phi$  HOLE

65mm (MIN.)

A

A

500

85mm (MIN.)

(30 - 100)

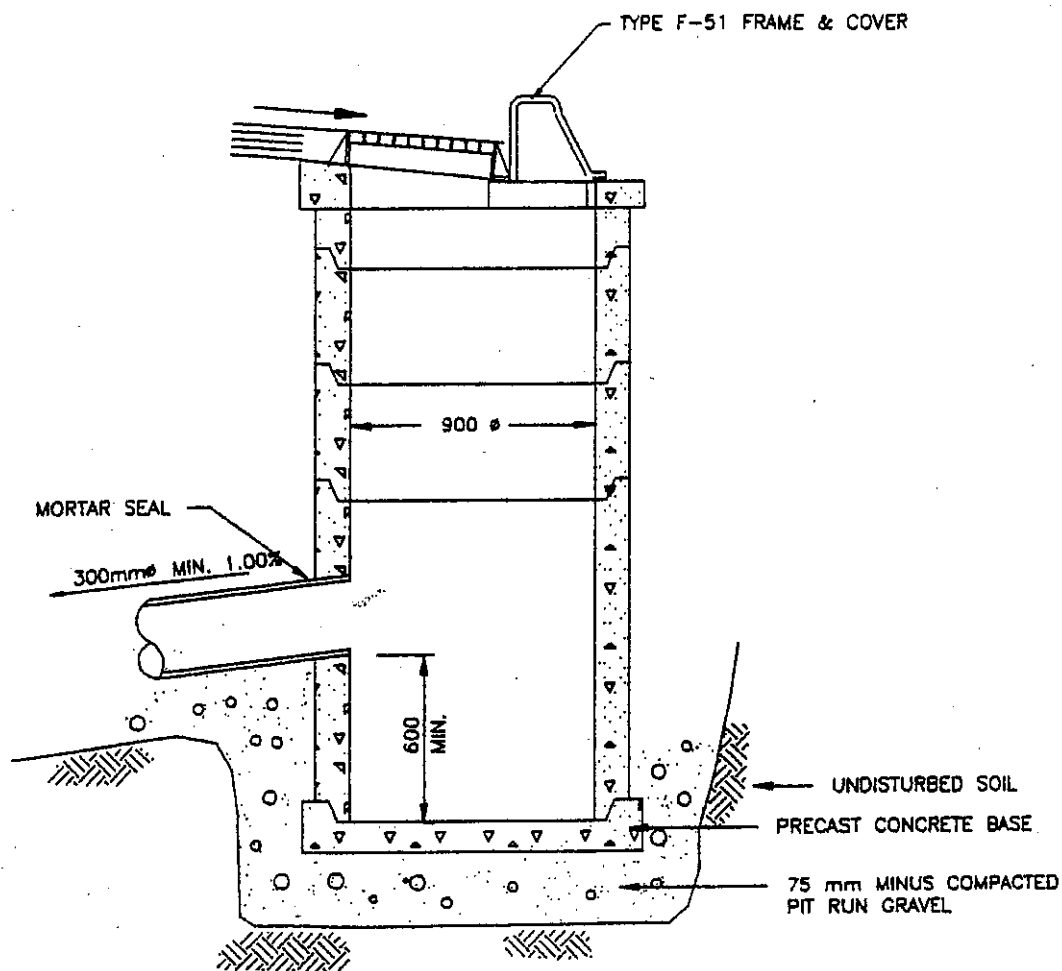
COMPACTED GRANULAR  
LEVELLING COURSE

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ ST-101

TOWN OF TABER  
STANDARD DETAILS

PRECAST CATCH BASIN

AutoCAD File : ST-102.DWG  
 Last Edit Date: 93/05/14

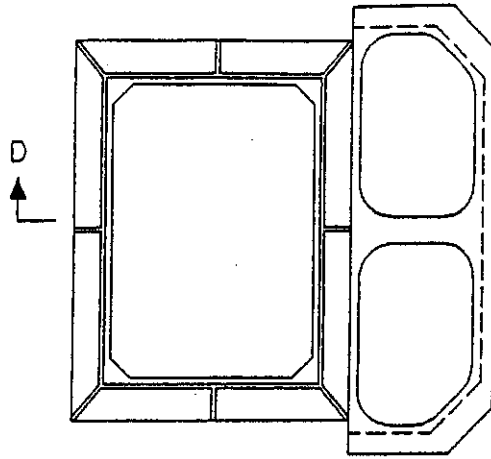


PROJECT NO. \_\_\_\_\_  
 DATE \_\_\_\_\_ MAY, 1993  
 APPROVED \_\_\_\_\_ R.M.  
 SCALE \_\_\_\_\_ N.T.S.  
 DWG. No. \_\_\_\_\_ ST-102

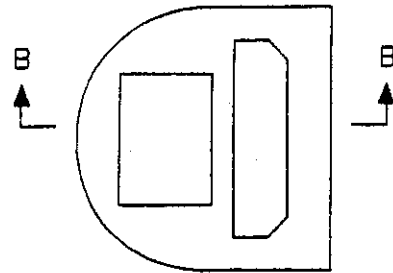
TOWN OF TABER  
 STANDARD DETAILS

CATCH BASIN 900mm I.D.

AutoCAD File : ST-103.DWG  
Last Edit Date: 93/05/14

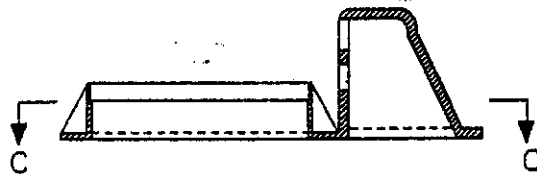


PLAN C-C

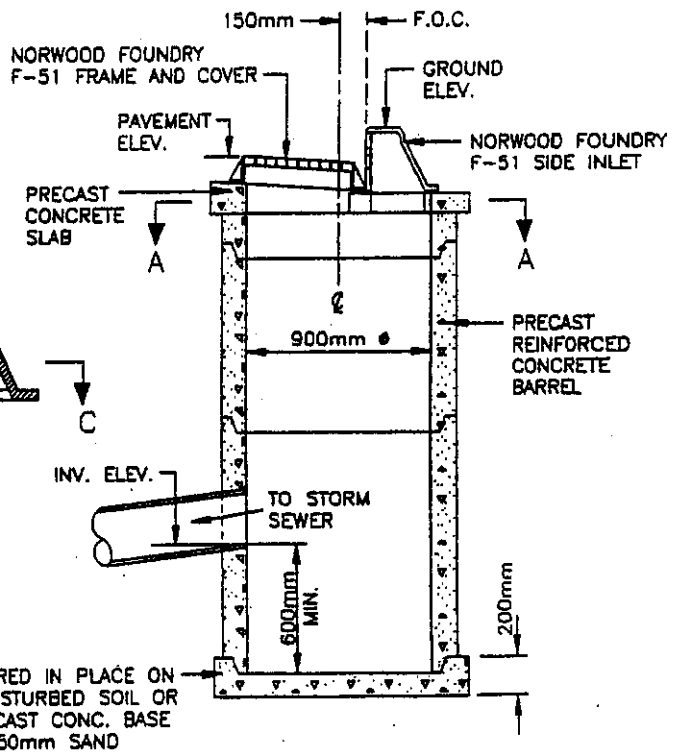


NOTE- ALL TOP SLABS ARE SEPARATE.

PLAN A-A



SECTION D-D



SECTION B-B

PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ ST-103

TOWN OF TABER  
STANDARD DETAILS

CATCH BASIN 900 mm I.D.

Diagram illustrating the installation of a gutter. The gutter is shown with a grate. Key dimensions and labels include:

- 250 (Vertical dimension on the left side of the gutter)
- 150 MIN. (Vertical dimension indicating the minimum height of the grate)
- 1500 (Horizontal dimension from the start of the slope to the grate)
- Labels: BACK OF CURB, FACE OF CURB, FACE OF GUTTER
- Text: START SLOPE TO GRATE BOTH SIDES

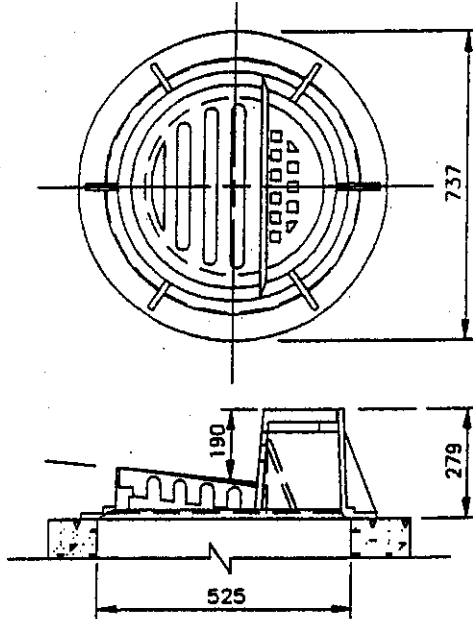
A cross-section diagram of a road. The road surface is shown as a horizontal line. Below it, a sloped line represents the ground. A horizontal dimension line above the road surface indicates a "SLOPE LENGTH" of "1500". A label "SLOPE 1:34.5" points to the sloped ground line.

A diagram showing a cross-section of a road. A horizontal line at the top is labeled "SLOPE" with an arrow pointing to it. Below this, a sloped surface is labeled "ASPHALT" with an arrow pointing to it. The road is supported by a concrete structure, and a small section of the road surface is shown breaking through the concrete.

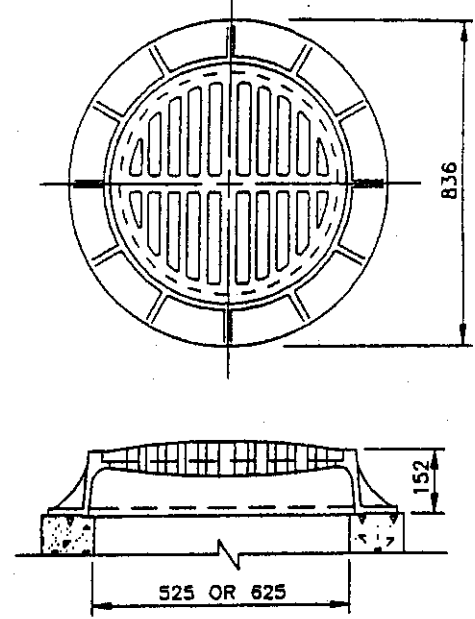
PROJECT NO. \_\_\_\_\_  
DATE \_\_\_\_\_ MAY, 1993  
APPROVED \_\_\_\_\_ R.M.  
SCALE \_\_\_\_\_ N.T.S.  
DWG. No. \_\_\_\_\_ ST-104

F-51 CATCH BASIN  
SET IN CURB AND GUTTER

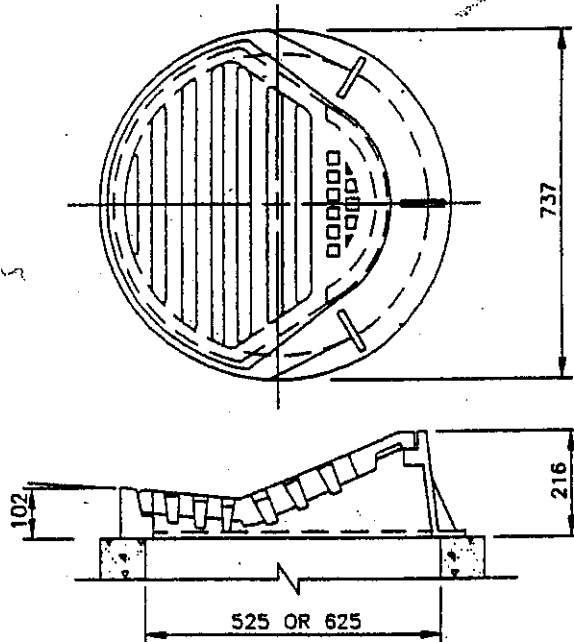
No. 2 SIDE INLET CATCH BASIN  
 FRAME AND COVER.



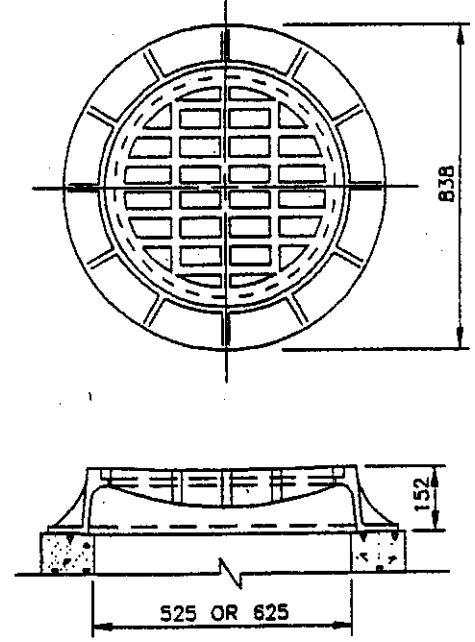
No. 6 ROUND TOP CATCH BASIN OR MANHOLE  
 FRAME AND COVER.



No. 7 CATCH BASIN FRAME AND COVER  
 FOR ROLLED FACE CURB AND GUTTER.



No. 8 LANE PAVING & PARA-RAMP CATCH BASIN  
 MANHOLE FRAME AND COVER.



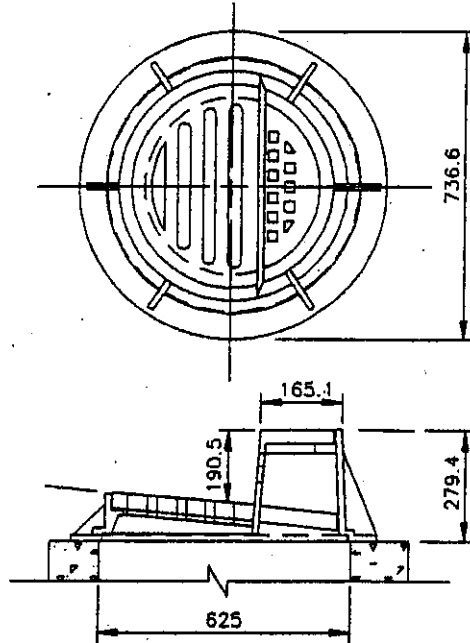
NOTE: ALL FRAMES AND COVERS

PROJECT NO. \_\_\_\_\_  
 DATE MAY, 1993  
 APPROVED R.M.  
 SCALE N.T.S.  
 DWG. No. ST-105

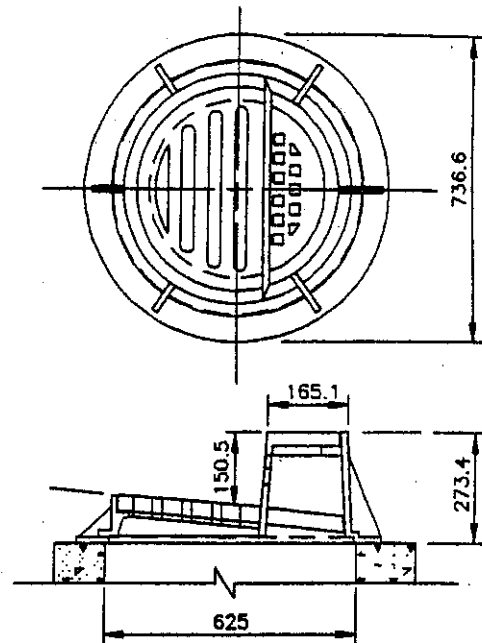
TOWN OF TABER  
 STANDARD DETAILS

STANDARD FRAMES AND COVERS

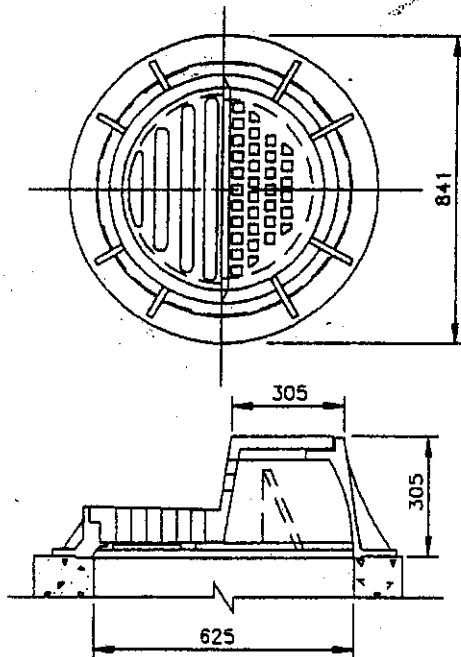
No. 2A TWO PIECE CATCH BASIN FRAME AND COVER WITH SIDE INLET FOR 190 CURB.



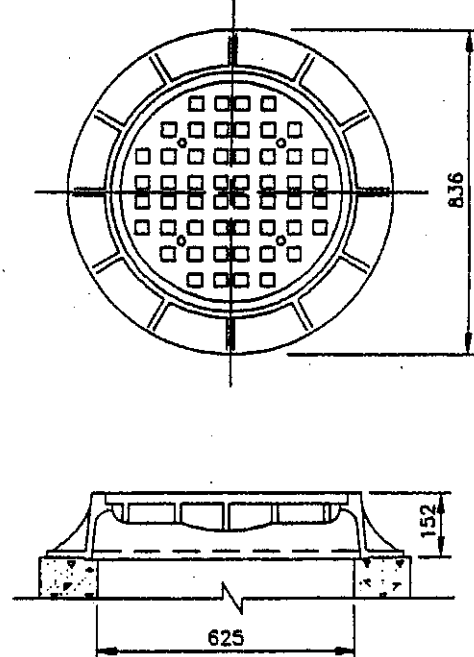
No. 2B TWO PIECE CATCH BASIN FRAME AND COVER WITH SIDE INLET FOR 150 CURB.



No. 4 CATCH BASIN MANHOLE FRAME AND COVER WITH SIDE INLET.



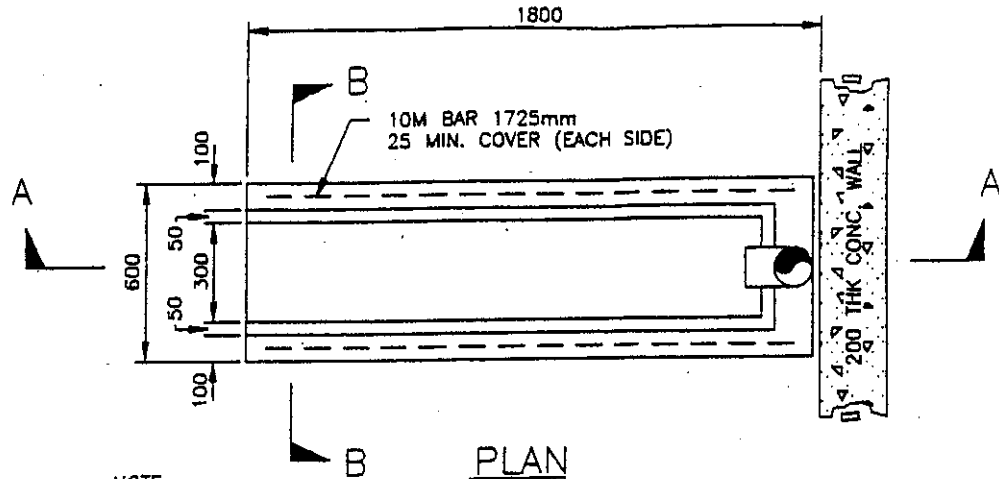
No. 6A STANDARD MANHOLE FRAME AND COVER.



PROJECT NO. \_\_\_\_\_  
 DATE \_\_\_\_\_ MAY, 1993  
 APPROVED \_\_\_\_\_ R.M.  
 SCALE \_\_\_\_\_ N.T.S.  
 DWG. No. \_\_\_\_\_ ST-106

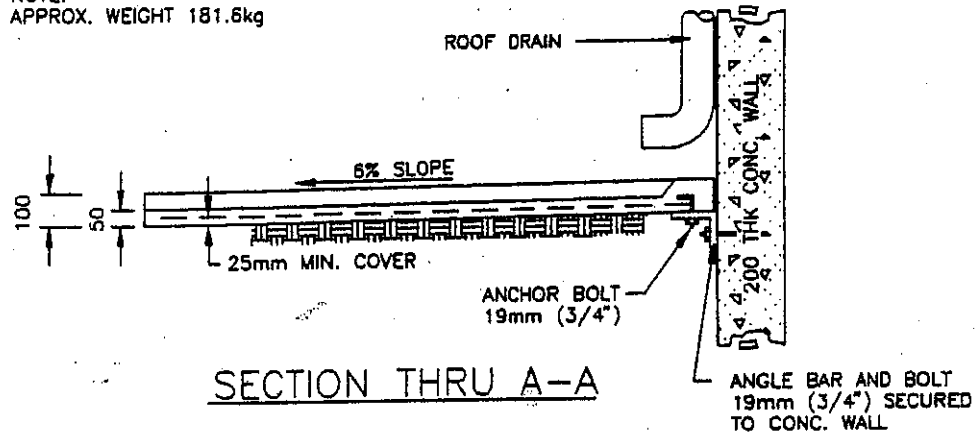
TOWN OF TABER  
 STANDARD DETAILS

STANDARD FRAMES AND COVERS

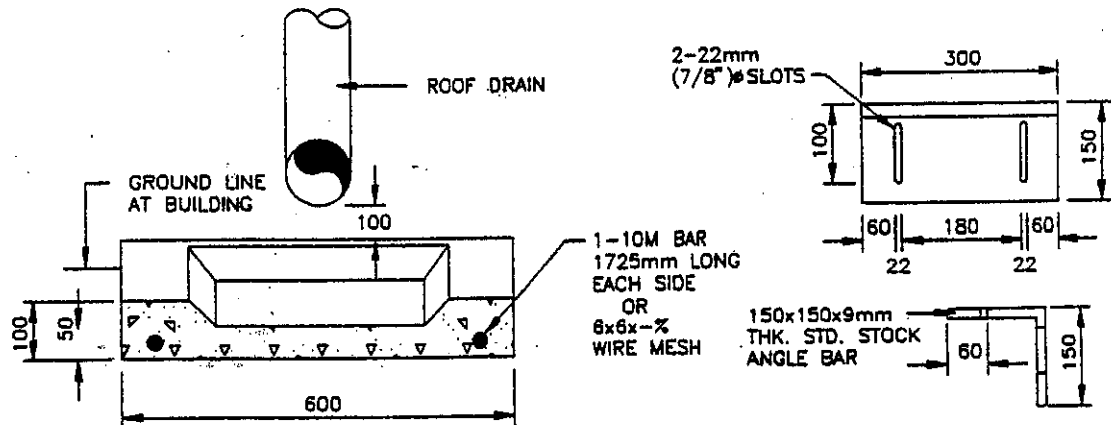


NOTE:  
 APPROX. WEIGHT 181.6kg

PLAN



SECTION THRU A-A



SECTION THRU B-B

DETAIL OF L BAR

PROJECT NO. \_\_\_\_\_  
 DATE \_\_\_\_\_ MAY, 1993  
 APPROVED \_\_\_\_\_ R.M.  
 SCALE \_\_\_\_\_ N.T.S.  
 DWG. No. \_\_\_\_\_ ST-107

TOWN OF TABER  
 STANDARD DETAILS  
 SPLASH PAD DETAIL